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Environmental Assessment for the Kelly Motorized Trail Project

Coconino National Forest



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Chapter 1 – Purpose and Need

Document Structure

The Forest Service has prepared this Environmental Assessment in compliance with the National Environmental Policy Act (NEPA) and other relevant federal and state laws and regulations. This Environmental Assessment discloses the direct, indirect, and cumulative environmental impacts that would result from the Proposed Action and alternatives. The document is organized into four parts:

- *Background:* The section includes information on the history of the project proposal, the purpose of and need for the project, and the agency's proposal for achieving that purpose and need. This section also details how the Forest Service informed the public of the proposal and how the public responded.
- *Comparison of Alternatives, including the Proposed Action:* This section provides a more detailed description of the agency's Proposed Action (B) as well as an Action Alternative (C) method for achieving the stated purpose and need, and the No Action Alternative (A). This discussion also includes possible mitigation measures. Finally, this section provides a summary table of the environmental consequences associated with each alternative.
- *Environmental Consequences:* This section describes the environmental effects of implementing the Proposed Action (B) and Action Alternative (C). This analysis is organized by resource area; within each section, the affected environment is described first, the followed by the effects of the No Action Alternative (A) that provides a baseline for evaluation and comparison of the other alternatives that follow.
- *Agencies and Persons Consulted:* This section provides a list of preparers and agencies consulted during the development of the environmental assessment.
- *Appendices:* The appendices provide more detailed information to support the analyses presented in the environmental assessment.

Background

The Flagstaff Ranger District manages 280 miles of Forest System Trails, 27 of which are open to motorized use. This provides for a variety of recreational trail opportunities, from remote and wilderness trails of Sycamore Canyon Wilderness to highly developed paved interpretive trails like Kendrick Park Watchable Wildlife Trail. Trails offer a growing need for recreation from the city of Flagstaff, smaller communities of Coconino County, visitors from the Phoenix metropolitan area, and other visitors to the National Forest.

Although the majority of trails are managed only for non-motorized use like hiking, horseback riding, and mountain biking the ranger district does provide some trail opportunities for motorized use. This includes the Fort Valley Trail System comprising about 18 miles of single track trail open to off-highway motorcycles and other non-motorized users; and the Munds Park Trail System that includes approximately 9 miles of trail managed for vehicles 50 inches or less in width. These motorized trails comprise less than 10% of the Flagstaff Ranger District system trails.

The Forest Service Trails Management Handbook (FSH 2309.18) defines an Off Highway Vehicle (OHV) as any motor vehicle designed for or capable of cross country travel on or immediately over land, water, sand, snow, ice, marsh, swampland, or other natural terrain (36 CFR, Part 212.1). This project will refer to OHVs as off highway motorcycles or dirt bikes, all

terrain vehicles (ATVs), and utility terrain vehicles (UTVs). The state of Arizona has seen a rapid increase of OHV use in the last two decades, Arizona Game and Fish Department (AZGFD) reports a 347% increase in OHV users since 1998 (www.azgfd.gov/outdoor_recreation/ohvFAQ.shtml#1). An estimated 11 million visits to national forests involve OHV use; making up about 5 percent of all recreation visits to national forests (English 2009). It is clear that OHV traffic can adversely affect natural resources and should be limited to trails (USDA Forest Service 2008). Forest visitors have indicated they want designated trails to ride on. Surveys show that the large majority of ATV users (over 81 percent) on the Forest prefer to ride on existing, well-defined roads; not off-road (USDA Forest Service 1999).

Goal 4 in the FY 2007-2012 USDA Forest Service Strategic Plan is: “Sustaining and enhancing outdoor recreation opportunities with minimized impacts to natural resources.” With this challenge, managers are faced with providing the growing pressure for OHV recreation opportunities while protecting forest resources.

Historically the project area has had a dense road network; many of these roads have been developed by a long timber history in the area. Over the last two or three decades the Coconino National Forest has established a number of administrative closures to prevent motorized use in areas with repeated user conflict or resource impacts. In the project area there has been only one closure established, the Old Munds Highway – Pumphouse Wash closure (04-98-04-R) closing 660 acres to cross-country travel. The remainder of the project area historically allowed unrestricted cross-country motorized travel. Because most of the project has relatively gentle terrain and the forest stands are generally open, many unauthorized routes have been established by repeated cross-country travel. In 2008 surveys of unauthorized routes were completed and approximately 313 miles of unauthorized routes were identified in the project area.

In the northwest corner of the project area (see Figure 1, below) unauthorized motorcycle trails have existed for over two decades. During the 1990s, new subdivisions, like Ponderosa Trails, were developed in the southern boundaries of the city of Flagstaff, which led to increase recreation use including motorcyclists repeatedly riding trails directly south of the Flagstaff Pulliam Airport. This trail mainly consisted of a loop approximately 18 miles long known as the “Airport Trails.” While it is unclear if these trails were actually constructed or simply created by repeated use of existing non-motorized trails, it is clear that fallen trees are usually cleared by the users. The most popular access for these trails actually begins on City of Flagstaff-owned land, and the trail crosses onto city land in several places. Although resource damage and trail construction activities have long been illegal, riding motorcycles on the Airport Trails had essentially been legal as “cross country” travel prior to the Travel Management Rule (TMR) decision (2011).

Travel Management Rule

Unmanaged recreation has been identified as one of the four primary threats facing the national forests. In 2005, the Forest Service directed all national forests and grasslands to identify and designate roads, trails, and areas suitable for motorized use; the Travel Management Rule (TMR) decision changed the motorized travel policy of the Coconino National Forest from one that was essentially “open unless posted closed” to “closed to unrestricted motorized cross-country vehicle travel unless specifically designated as open” (TMR Record of Decision, 2011). In the Record of Decision, Kristin Bail, Deputy Forest Supervisor, expressed her commitment to “additional motorized route planning and making changes to motorized use management through the National Environmental Policy Act to continue improvement of forest access, motorized recreation, and the protection of forest resources for current and future generations,” (2011). As this decision effectively closed numerous miles of non-system trails to the public, there is a need

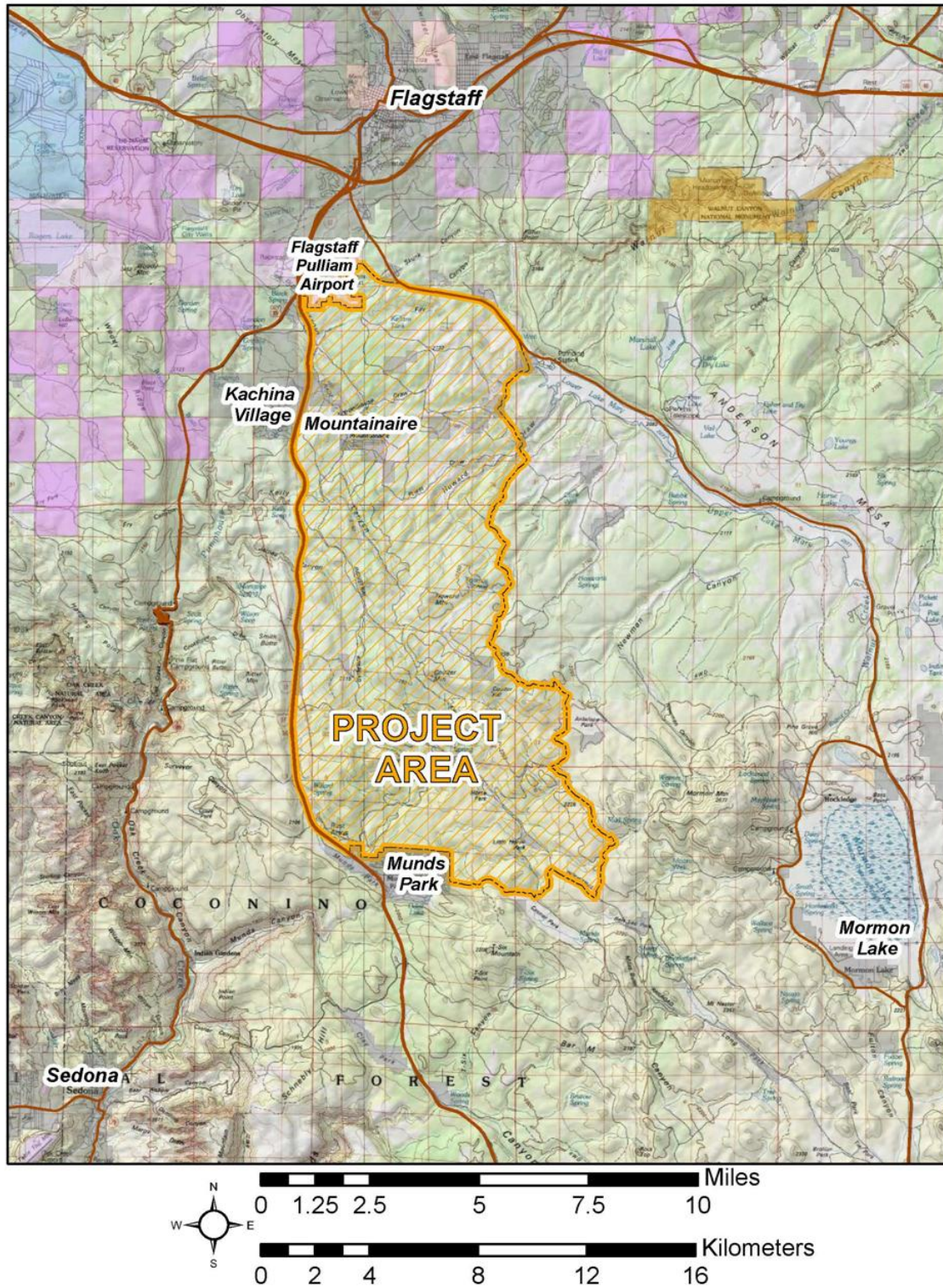
to develop a successful and sustainable trail system to provide for this recreation opportunity to address unmanaged and unauthorized OHV use (Meyer, 2011).

From the TMR decision the Motor Vehicle Use Map (MVUM) has been created. The MVUM identifies 129 miles of roads, 9 miles of trails for motorized use, and no areas open to unrestricted cross-country travel in the project area. The Airport Trails were considered during the Coconino Travel Management planning process and are not designated routes, and with the implementation of Travel Management Rule it is now illegal to operate a motorcycle or any other motor vehicle on these trails.

Motorized Trails

During the TMR planning process local motorized users began meeting with district personnel to discuss the inclusion of additional motorized trail in the decision. Specifically in 2003, the Coconino Trail Riders (CTR) were organized to work with the Forest Service to promote single-track riding opportunities in Northern Arizona and to provide a voice for responsible off-road trail motorcycle recreation. Although some motorized trail would be designated through TMR, approximately 100 miles of trails were not designated due to various resource concerns. It was felt that additional areas of the district should be investigated for motorized trail opportunities. By 2009 the project area was loosely defined because of the existing system, social, and user trails (Airport and Munds Park trails), easy access from multiple communities and major roads, and relatively low density of other recreation opportunities in the area. Meetings began with CTR in early 2011 to develop a concept of trails and trailheads that were designed for both motorcycles and larger OHVs. Throughout the spring and summer of 2011 district personnel and motorized users spent time in the project area exploring various opportunities and developed a proposal. This proposal was revised as Forest Service interdisciplinary team met along with AZGFD and US Fish and Wildlife Service and finally developed into the Proposed Action in this document.

Figure 1: Project Area Vicinity Map



Purpose and Need for Action

Within the project area there is a need to:

- **Provide a diverse trail system that meets the increasing public demand for motorized recreation on designated routes.**
 - Provide for a full day motorized recreation experience.
 - Provide for a motorized trails system of sufficient length to allow for small group and families.

Currently there are only a small number of trails designated specifically for motorcycles, few designated for ATVs, and none designated for larger OHVs. Most OHV recreation takes place on forest roads that are shared with full-sized vehicle traffic. Over 2,500 miles of road are open to motorcycles, ATV's and UTV's not specifically designated for these vehicle types. These roads provide for access and some level of motorized recreation, but do not provide for much technical challenge or desired recreation experiences that trails designed for OHVs can provide (Siderelis et al. 2010, Coconino Trail Riders 2007).

By planning and constructing a motorized trail system that provides quality recreation experiences for both motorcycles and larger OHVs, and while protecting resources the demand for motorized recreation will be better met in the project area. Establishing trailheads to access the trail system would provide an opportunity for education on proper use of motorized trails as well limit impacts to other resources.

- **Successfully implement the Coconino National Forest TMR decision to reduce impacts to water quality, wildlife habitat and other Forest resources.**

A large number of routes exist in the project area that is closed to motorized travel. These routes have been closed because of wildlife habitat, archeological sites, sensitive soils, meadows, and riparian areas. Currently the most of these routes are not physically blocked, and are only enforced using the MVUM. Illegal motorized use on these routes continues to contribute to adverse resource impacts.

In addition by decommissioning and rehabilitating some roads and trails in the project area these routes would begin to return to natural conditions, further reducing unauthorized motorized use.

Proposed Action

To meet the Purpose and Need, the Forest Service proposes to construct a 73 mile OHV trail system and two trailhead parking facilities. The proposed action is described in detail in Chapter 2 Alternatives, and is illustrated in Figure 2. The proposed trail system is located in Coconino County between the cities of Flagstaff and Munds Park, in T20N and T19N R7E. The proposed trailheads are located at T20N R7E Section 11 and T19N R7E Section 5 (see Figure 3).

The trail system would be constructed and designed for both off-highway motorcycles and larger OHVs like UTVs. Approximately 37 miles would be designed for motorcycles with an 18 – 24 inch native tread surface. Another 36 miles would be designed for OHVs, with a native tread width no wider than 62 inches. The design criteria for trail construction and operation are located in Appendix A.

The proposed action also includes the decommissioning of approximately 14 miles of closed roads. This includes roads closed under the Coconino TMR decision and unauthorized routes in the project area.

Decision Framework

Given the purpose and need for action, the deciding official will review the No Action A, Proposed Action B, and Action Alternative C and their associated effects, and decide whether or not to approve the Proposed Action or any of the alternatives, in part or in their entirety.

Public Involvement

While developing the proposal the Forest Service attended a meeting held by the Coconino Trail Riders, a local motorcycle club, on February 4 and March 11 of 2011. The proposal was listed in the Schedule of Proposed Actions starting October 2011. The 30-day public scoping period began on December 01, 2011, when scoping letters were mailed to interested parties by regular mail and email. A news release was issued at the time the scoping letter was released. Hard copies of the scoping letters, including the Proposed Action and map, were sent to 105 individuals, including 5 tribes as being potentially interested through the quarterly Schedule of Proposed Action (SOPA) meetings.

An email containing the scoping letter, Proposed Action and map were also emailed to approximately 1,848 contacts; the mailing list was comprised of potentially interested contacts from the Coconino National Forest Travel Management Rule effort, local and national environmental groups and/or individuals, as well as individuals who had requested to be contacted (see Project Record for detailed mailing list). In addition, the project was listed on the forest-wide SOPA and the Proposed Action and map were posted on the Coconino National Forest planning website. Comments could be submitted on this site and 5 comments were received using this method.

As part of the public involvement process, the agency hosted two public meetings to disseminate information and gather input about the actions proposed: one December 15th at the Coconino National Forest Supervisor's Office, and one on December 17th in Munds Park, AZ. Approximately 48 people attended the December 15th meeting, and five people attended the December 17th meeting. Meetings were also held with Arizona Game and Fish Department on January 23, 2012 and US Fish and Wildlife Service on April 19, 2012.

The Forest Service received a total of 231 comments by the end of the scoping period. Using the comments from the public, other agencies, and local tribes, the interdisciplinary team developed a list of issues to address (see *Issues* section). Meeting notes, sign-in sheets, comment letters, and emails are all included in the Project Record.

Issues

The Forest Service separated the issues into two groups: key issues and other issues. Key issues were defined as those directly or indirectly caused by implementing the Proposed Action. Other issues were identified as those: 1) outside the scope of the Proposed Action; 2) already decided by law, regulation, Forest Plan, or other higher level decision; 3) irrelevant to the decision to be made; or 4) conjectural and not supported by scientific or factual evidence. The Council for Environmental Quality (CEQ) NEPA regulations require this delineation in Sec. 1501.7, "...identify and eliminate from detailed study the issues which are not significant or which have been covered by prior environmental review (Sec. 1506.3)..." A list of non-significant issues and reasons regarding their categorization as non-significant may be found in the project record.

This section identifies the issues that serve to highlight effects or unintended consequences that may occur from the Proposed Action and alternatives, giving opportunities during analysis to

reduce adverse effects and compare trade-offs for the decision-maker and public to understand. Based on the scope of the project, the following issues were identified for further analysis:

Issue #1: Noise – Use of the trails by OHVs would result in noise levels that would disrupt dispersed forest users, non-motorized users, and adjacent private land owners.

This issue is addressed by including an analysis of noise in this assessment. A Geographic Information Systems (GIS) Sound Analysis was completed for the project area including a baseline decibel level to assess the current level of noise created by vehicle and OHV traffic. This baseline and all Alternative decibel levels are discussed in the Recreation section of Chapter 3.

Issue #2: Wildlife Disruption – OHV traffic on the trails and the noise associated with the use will displace and disturb wildlife in the area. Use of OHVs will destroy wildlife habitat.

This issue was addressed by analyzing effects of OHV use on wildlife and to wildlife habitat. A GIS Sound Analysis provided decibel levels in the project area specifically on sensitive wildlife areas, including a baseline decibel level to assess the current level of noise created by vehicles and OHVs. Impacts to wildlife and wildlife habitat are further discussed in the Wildlife section of Chapter 3.

Issue #3: Trails Do Not Meet the Needs of Motorized Users – Opportunities for various motorized skill levels are limited; there is a need for practice areas and areas for observed trials riding. There is a desire for more loop opportunities to reduce the need for “out and back” riding. With the increase in popularity of larger OHVs such as utility-terrain vehicles (UTVs) the trails should not be limited to vehicles with 50 inches or less width. There is a lack of connectivity in the project area, Forest System Roads 78, 78A, and 78B should be open.

An additional alternative C has been developed to address the needs of motorized users, further discussed in Chapter 2 Alternatives. Alternative C includes a technical trail to meet the needs of more advanced and trial type riders. Also included in Alternative C is additional trail to create more loop opportunities. In addition, Alternative C also includes opening Forest Road 9462A to all vehicles to provide for better connectivity in the project area. All action alternatives for OHV trail are designed for vehicles with 62 inches or less width, to include UTVs but disallow jeeps and trucks.

Issue #4: This Project Does Not Meet the Intent of the New Travel Management Rule – Travel Management Rule road closures and decommissioning should be funded and implemented before constructing motorized trail projects. The Forest should designate and provide motorized recreation on the existing open roads and not open closed or new routes.

The Travel Management Rules specifically mentions that “provision of recreation opportunities” should be considered when making changes to designation of routes and areas (36 CFR 212.55(a)). The no action alternative analyzes the opportunity for motorized recreation on exiting open roads. All action alternatives include decommissioning approximately 14 miles of roads identified as closed through TMR.

Issue #5: Funding for Implementing Trail Construction, Designation, and Decommissioning- Ensuring funding for implementation of the project activities is beyond the scope of the project, yet the ability to fund the project has been carefully considered. A major source of funding would likely be the Arizona Statewide Off-Highway Vehicle Program administered by the Arizona State Parks. The goal of the program is “to develop and enhance statewide off-highway vehicle recreational opportunities, and develop educational programs that promote resource protection, social responsibility, and interagency cooperation” (azstateparks.com/ohv). The program administers funds for competitive grants to meet the goals

of the program. These funds are acquired from a small percentage of state gas taxes, Federal Highway Administration Recreational Trails Program (RTP) funds, and percentage of the OHV Decal funds, required from owners of OHVs 1,800 pounds or less in Arizona. The Kelly Motorized Trail Project fits well with the State OHV Programs goals and criteria; many aspects of this project meet high level priorities. Although the process for obtaining grants from the Statewide OHV Program is a competitive process, it is likely that implementing phases of this project would compete well.

Issue #6: Mercury Issues raised during scoping related to water quality were pollution by mercury, primarily of Lower Lake Mary which is a drinking water source and has levels exceeding state water quality standards (ADEQ, 2010a). The immediate source is considered to be sediment from watershed runoff; the concern is that this might be exacerbated by an enhanced trails system that would induce increase runoff and sediment delivery. The proposal to decommission roads in the project area would reduce the soil disturbance from motorized travel and improve downstream water quality to Lake Mary including reduce sediment that may be delivering mercury to Lake Mary. This issue is discussed in the Hydrology section of Chapter 3.

Chapter 2 - Alternatives

This chapter describes the alternatives considered for the Kelly Trails Motorized project. It includes a description and map of the Proposed Action B and Action Alternative C. It also presents the alternatives in comparative form related to the issues identified during the scoping process, defining the differences between each alternative and providing a clear basis for choice by the decision maker and the public.

Alternative A

No Action

Under the No Action alternative, current management plans would continue to guide the management of the project area. No motorized trails would be constructed, existing non-system routes would not be decommissioned, and no roads would be converted to trails. Two trailheads would not be constructed. In addition, no roads closed under the TMR decision would be proposed for decommissioning. The project area would continue to provide motorized recreation on the open forest road systems, which includes 40 miles of road Open to Highway Legal Vehicles Only, 89 miles of road Open to All Vehicles, and 9 miles of trail Open to Vehicles 50” or Less in Width.

Legend

- 1 Roads Open to All Vehicles, Yearlong
- 2 Roads Open to All Vehicles, Seasonal
- 3 Roads Open to Highway Legal Vehicles Only, Yearlong
- 4 Roads Open to Highway Legal Vehicles Only, Seasonal
- 11 Special Designation, Yearlong
- 12 Special Designation, Seasonal
- 13 Interstate
- 14 State or US Highway
- 15 Other Public Roads
- Trails Open to Vehicles 50" or Less
- Existing Trailheads
- Project Area
- Flagstaff_CityLimits

Scale

0 0.5 1 2 3 4 Miles

0 1.25 2.5 5 7.5 10 Kilometers

Alternative B

The Proposed Action

To meet the Purpose and Need of the project, the following activities are proposed:

Trail System

The proposed action trail system would designate approximately 73 miles, of which 37 miles would be designed for motorcycles only, and 36 of which would be designed for use by OHVs 62 inches or less in width (see Table 1). This mileage was designed to provide motorized recreation opportunities that could be ridden in an entire day or enjoyed for many days of travel and to accommodate riders of various skill levels.

The trail system would be created using a combination of methods, including designating roads open to all vehicles, converting closed roads to trails or road to trail conversion, adoption of existing unauthorized trails, and constructing new trails.

Trail management, designation, and construction would be defined by two different design parameters; designed for motorcycles or designed for OHVs (see Design Criteria in Appendix A).

Table 1: Mileage of proposed trail system under Alternative B, the Proposed Action

Action	Motorcycle Miles	OHV Miles
Road to Trail Conversion	6	17
Adoption of Unauthorized Trail	6	--
Roads Open to All Vehicles	--	11
New Construction	25	8
Total	37	36
73 Total Trail Miles		

Road Decommissioning

This alternative also includes decommissioning approximately 14 miles of non-designated (closed) routes. These routes were proposed to mitigate impacts to sensitive wildlife habitat, and improve soil and water quality by reducing erosion from these routes. These routes include Forest System roads closed by the TMR decision and unauthorized motorcycle trail near the Flagstaff Pulliam Airport. Decommissioning would be accomplished when all three actions have taken place; removal of any posted road designators (road numbers or names), changing the status in the Forest Service road database; and implementing decommissioning treatments.

Decommissioning treatments may include blocking the road entrance with boulders, ripping the road bed for a visible distance from a road or trail junction, forming berms into the road bed, installing/maintaining adequate drainage, seeding with native seed mixes, and/or scattering slash along the road.

Trailheads

Two new trailheads would be created to access the proposed trail system: one within one mile of the Kelly Canyon interchange on Interstate 17 along Forest Road 700H near Forest Road 700, and another within a mile of Forest Highway 3 (Lake Mary Road) on Forest Road 867, near Fay Canyon (see Figure 3: Map of the Proposed Action Alternative B). These new trailheads would closely resemble the existing Crystal Point Trailhead located adjacent to the community of Munds Park, which could also be used to access the trail system. In addition, the access gate at

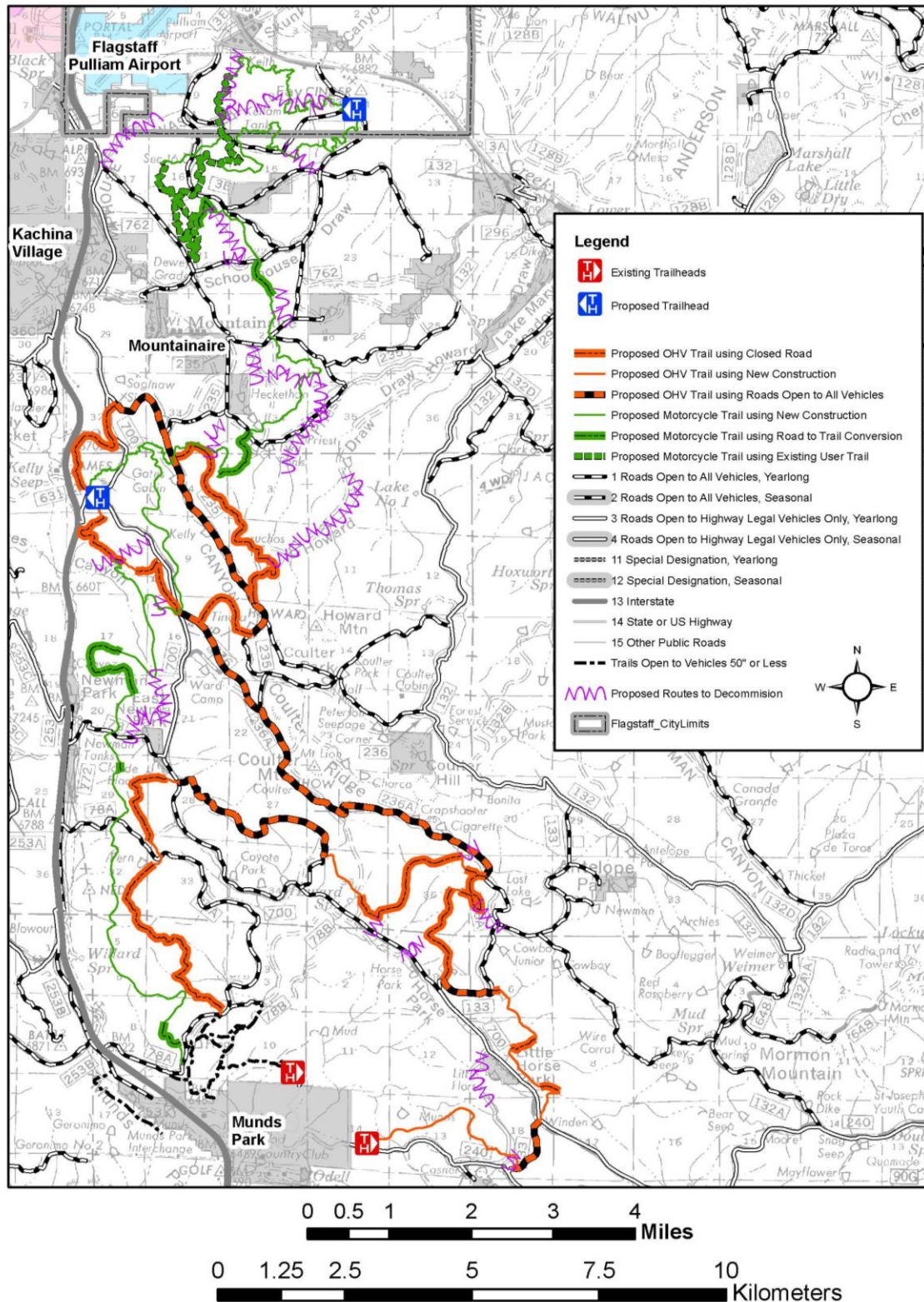
Janice Place would be updated from the current 50 inches to 62 inches to accommodate the trail system size designation. Trailheads would each be approximately 30,000 square feet (0.7 acres) in size with limited facilities. These trailheads would accommodate approximately ten vehicles with trailers. This would include hardened parking surface of natural or native material, parking barriers of pipe or boulders, and potentially facilities including a vault toilet. Trailheads would also include informational kiosks that would provide education about responsible trail use and ethics. These kiosks would also provide users with information on current conditions including; planned tree thinning and prescribed fire activities in the area, the possibility of encountering livestock in open ranges, and upcoming special use events and volunteer maintenance days on the trail system.

Construction and Maintenance

Adding 73 miles of trail and two new trailheads to the system of trails and recreation sites on the Flagstaff Ranger District is a large undertaking. Implementing the proposed action would take considerable staff time and financial allocation; however the project would likely be implemented using a variety of funding sources, including grants and volunteers. It is also likely the proposed action would be implemented in phases over multiple summer seasons. A common problem when constructing new facilities and trails is the lack of funding to maintain these features. In the future, seeking funding and volunteer sources for maintaining the Kelly Motorized Trail System would also be necessary.

Volunteer efforts would also play an important role. The Flagstaff Ranger District (the District) has a remarkable volunteer program. The District has recently averaged about 20,000 volunteer hours per year. These volunteers have provided support on many different projects and in many different functions of the Forest Service. Approximately 12,000 of those hours were spent on trail related construction and maintenance. In 2011, both individuals and groups of volunteers focused on a variety of trail projects including: clearing trails, maintaining trail tread, trail sign installation, completing trail reconstruction, constructing new trails, maintenance and cleaning of trailhead facilities, and construction of trailhead features including signs and kiosks. If the proposed action is implemented, these volunteers would continue to grow and incorporate portions of the construction and maintenance of the Kelly Motorized Trail System.

Figure 3: Map of Proposed Action Alternative B



Alternative C

The Alternative C would be similar to Alternative B, the Proposed Action, in that this alternative includes the trails identified in the Proposed Action as well as the two trailheads and road proposed for decommissioning; however the Alternative C also includes the following:

Trail System

In addition to the 73 miles of trail identified in Alternative B, an additional 14 miles of trail designated for motorcycles only and 9 miles of trail designated for vehicles 62 inches and less would be designated (see Figure 4: Map of Alternative C). Compared to Alternative B this additional mileage would provide extra loop opportunities and opportunities for a longer and more varied riding experience.

Table 2: Mileage of Proposed Trail System under Action Alternative C

Action	Motorcycle Miles	OHV Miles
Road to Trail Conversion	8.5	20
Adoption of Unauthorized Trail	7.5	--
Roads Open to All Vehicles	1.5	14
New Construction	35	10
Total	52	44
96 Total Trail Miles		

Technical Trail Section

This alternative includes a 1.5 mile technical loop near the proposed trailhead near Forest Highway 3 (Lake Mary Road). This utilizes a nearby material pit and includes natural features including rock. All features would have a by-pass, allowing riders to avoid riding beyond their abilities. This route would be separated from the rest of the trail system and include signage informing users of the intent of this loop.

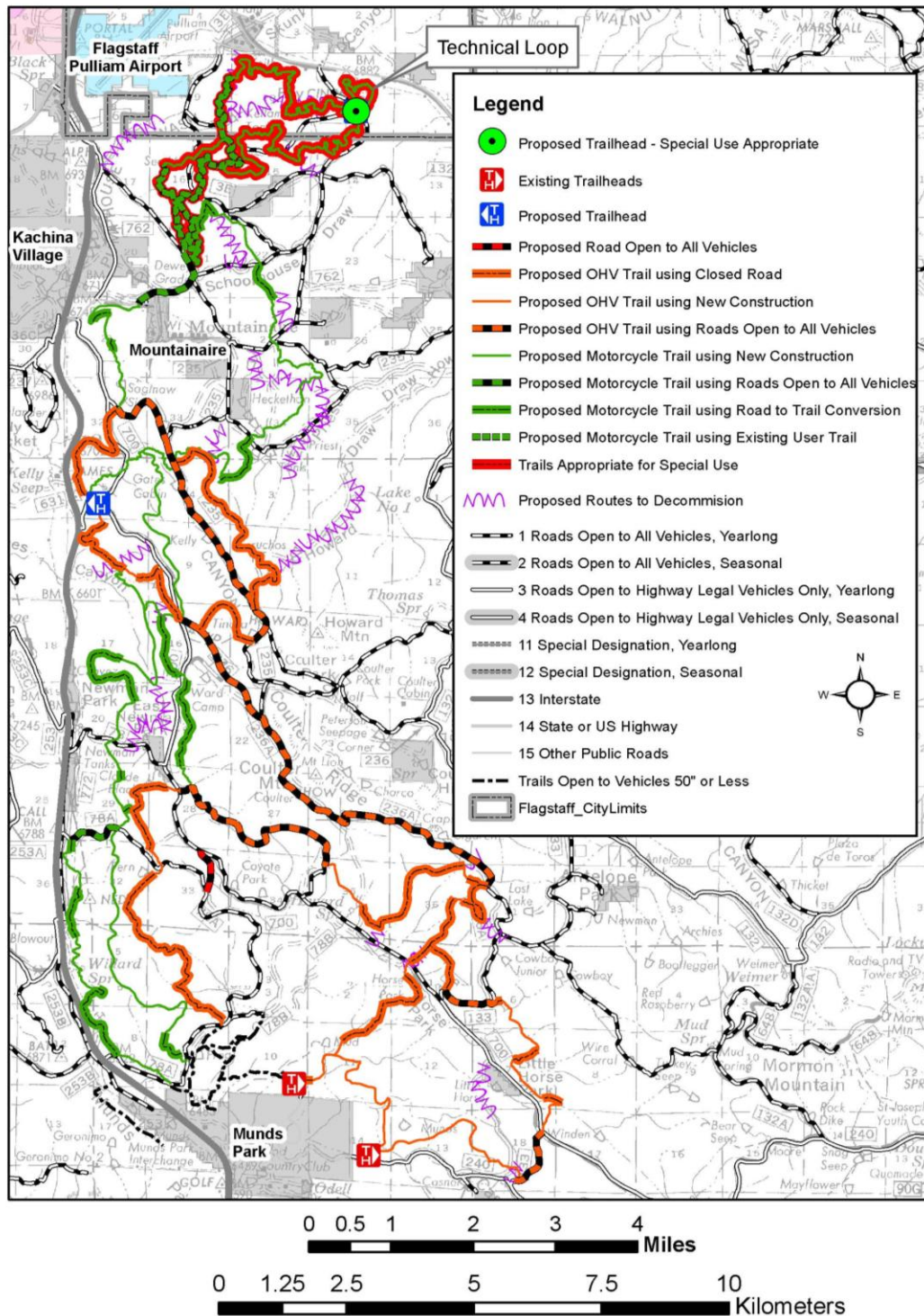
Forest Road 9462A

Forest System Road 9462A is currently closed and proposed to be open to all vehicles under this Alternative. This would provide a connection for all vehicles wishing to access areas of the forest north and east of Munds Park without having to travel through the community. The road connects Forest Roads 78A and 700 and is ½ mile in length. No activities would be necessary to physically open this road.

Special Use Recreation Events

The Alternative C would also identify an area to facilitate special use permit requests for recreation events. This would include using the proposed trailhead in the northern portion of the project area, adjacent to Forest System Road 867, as a staging area. In addition to the staging area approximately 16 miles of motorized trail designed for motorcycles would be identified as desirable for Special Use Recreation Events. The technical trail section near Lake Mary Road could also be used for events including Observed Trials. Types of events that could be permitted could include a variety of trail races and group rides, but because the trails only consist of single track motorcycle trail in this area no ATV or UTV events would be permitted.

Figure 4: Map of Action Alternative C



Design Features common to both action alternatives

The following are design features or mitigation measures developed to avoid or lessen the potential effects to resource areas by actions associated with the Proposed Action (B) and Action Alternative (C).

Enforcement

Proper trail use would be enforceable through the Travel Management Regulations requiring motor vehicle use to only occur on designated routes and areas as identified on the Motor Vehicle Use Map (MVUM). The Forest Supervisor would continue to implement Special Orders or rely on existing regulations to restrict public use on roads, trails, and/or areas where unacceptable resource damage is occurring. Title 36 CFR Part 261 prohibits damage to the land, wildlife, or vegetative resources. The Federal Land Policy and Management Act of 1976 also includes this provision.

Wet Weather Conditions

The motorized trail system would be subject to the wet weather travel restrictions associated with adjacent Forest roads. These restrictions would provide for temporary closure of the trail system to motorized vehicle use in conjunction with the Forest road system when heavy precipitation or ice causes saturation of soils or dangerous driving conditions. Closures are implemented as an administrative decision, based on weather conditions (rather than fixed dates), to allow for flexibility due to the variable weather of the high elevation environs that occur on the Coconino National Forest.

Wildlife

- As much as possible, down woody components (downed logs 12 inches in diameter) would be retained during new trail construction to maintain habitat for the prey of raptors.
- Cut trees as needed for trail creation but avoid cutting snags, pine, or fir trees greater than 9 inches dbh, or oak trees larger than 5 inches diameter at root collar.
- No new trail construction activities within Mexican Spotted Owl (MSO) protected areas (including protected activity centers) would occur during the MSO breeding season (March 1 to August 31).
- Conduct pre-implementation surveys for MSO to determine occupancy per Forest Plan direction.

Trail construction

Motorcycle

- In road to trail conversion, a trail surface of 18 to 24 inches would be created by obliterating and rehabilitation of a road, while using a portion of the old road bed for trail tread. This is proposed in locations where a road is no longer needed for any administrative purposes in a suitable trail location.

OHVs

- Where portions of designated roads are incorporated into the proposed trail system, all motor vehicles would be allowed on these segments. The only modifications of these open roads would include directional signage for the trail system.
- In road to trail conversion for OHVs, a desired trail surface of 62 inches using a portion of the old road bed for trail tread. This is proposed in locations where a road is no longer needed for any administrative purposes in a suitable trail location. Only OHVs less than 62 inches wide would be allowed on these portions of the trail.
- Road to trail conversion may require additional trail structures and features including rolling dips and integrated water control with drainage.

- Vehicles over 62 inches would not be permitted on the trails designated for OHVs; the exception would be those portions of the trail system that utilize roads open to all vehicles. Other road crossings and unions would be constructed to deter and limit use by motor vehicles larger than 62 inches in width by incorporating a variety of techniques to limit access, including the use of vegetation, rock, or other constructed features.

Safety

- Trail design would incorporate numerous curves and few long straight sections while also incorporating line of sight for safety purposes. This would prevent excess speeds, but still allow riders to maintain good visibility to oncoming traffic.
- While designed primarily for motorized recreation, the trail system would still be open to non-motorized uses including mountain bikes, hikers, and equestrians. Appropriate signage would be placed at trailheads and along the trail system to inform users of the probability of encountering motorcycles, bikes, hikers, and equestrians.

Range

- Where trails would cross range fencing, raised motorcycle/OHV cattle guards would be installed that allow for easy and routine maintenance.
- Stock tanks would be signed to discourage motorized use within or adjacent to; if use and damage occurs, additional barriers such as logs could be used to protect stock tanks.
- Cattle guards would be installed in appropriate locations with good sight and straight angles and would be properly signed for safety. Cattle guard locations would also include simple gates next to fence crossings to allow for equestrian crossings.
- Information would be posted at trailhead kiosks to inform users of possible encounters with livestock.

Botany

- New construction would avoid impacts to Threatened, Endangered and Sensitive (TES) plant species. Prior to construction, coordination would occur with the forest botanist to ensure that route alignments are chosen that would not impact TES plants. Personnel involved in the trail construction would be trained in the identification of these plants to expedite survey efforts.
- All decommissioning and restoration would be planned and implemented to avoid impacts to TES species.
- Conduct implementation and effectiveness monitoring of affects from recreational activities to plant resources (Appendix K, Coconino Forest Plan 1987)

Noxious/Invasive Weeds

- For new construction, decommissioning and restoration, all mechanized heavy equipment to be used off of system roads would be cleaned prior to entering the project area. This is to reduce the likelihood of introduction or spread of non-native invasive plants.
- Prior to construction, coordination would occur with the district weed contact or Forest botanist to conduct pre-implementation surveys to evaluate and avoid to the extent possible noxious weed occurrences.
- Where available, any plant materials used for decommissioning and restoration would be from on-site sources (e.g., chipped wood, etc.). All plant material from off-site sources (straw, mulch, etc.) must be certified weed free.
- Information and training would be provided to field-going OHV and resources patrol employees and volunteers regarding invasive non-native plant species to help identify new introductions before they become difficult to eradicate.

Soil and Watershed

Resource protection measures for soil and watershed would follow Best Management Practices (BMPs) and the Soil and Watershed Conservation Practices handbook (USDA Forest Service 1991). Resource protection measures are put into place to minimize nonpoint source pollution as outlined in the intergovernmental agreement between the Arizona Department of Environmental Quality and the Southwestern Region of the Forest Service (ADEQ 2008). BMPs would include the following practices:

- BMP#1: Use the following BMP techniques to minimize sediment delivery to intermittent streams from impacts of trail construction and trail location on severe erosion hazard sites: Outsloped road surface; Leadout ditches and relief culverts; Energy dissipators on culverts; Vegetating cut and fill slopes; Riprap installation; Rolling grade.
- BMP#2: Locate new trail segments at on hill contours as much as possible. If having to cut and fill, preferred drainage is outsloping trail. Utilize additional drainage features outlined in BMP #1 in design and maintenance of the trail as warranted to minimize impacts of trail construction and trail location on sediment production.
- BMP#3: Minimize cut and fill in construction of trails having poor soil strength. Locate trails on contour and in as flat a position as possible. If cut and fill are needed, utilize rock rip rap to strengthen outslopes to minimize impacts of trail construction and trail location on sediment production by limiting failure of trail.
- BMP#4: Locate new trail segments at least 1 chain (66 feet) away from drainages in an upland position. Minimize drainage crossings and try to cross drainage as close to perpendicular as possible. Utilize BMP #1 in design and maintenance of the trail. This BMP would minimize sediment delivery to intermittent streams from impacts of trail construction and trail location on severe erosion hazard sites and on impaired soil sites.
- BMP#5: In Lower Lake Mary a new trail segment should have a minimum 2 chain width filter strip between it and a natural channel. Lower Lake Mary is listed in the state 303(d) reports as impaired (mercury in Mary Lake).

Monitoring

Trail Assessment and Condition Surveys (TRACS) is the current method used by the Forest Service to monitor trail conditions and needs. TRACS is a systematic and standard approach for collecting and updating field data on trail conditions and determining needs to meet trail standards to provide for public health and safety, reduce erosion and sediment, and deliver quality recreational experiences. Since 1999, national Forest Service protocols have required the completion of some type of trail assessment and condition survey on an annual basis. The Coconino National Forest annually completes TRACS on 20% of system trail miles, so each mile of trail receives a survey once every five years.

TRACS will be an important monitoring tool for the proposed trail system. When any Forest Service System trail is adopted or constructed, a Trail Management Objectives (TMOs) is created. This will be the cornerstone of how a trail is managed. By completing TRACS, managers will be able to monitor for issues to the trail system. These issues could be increased erosion in areas; creation of unauthorized trails; or identifying wet or muddy areas of trail. With this information managers will be able to identify why these issues are occurring, make prescriptions for correcting problems, and implement these prescriptions (USDA, 2009).

The Coconino National Forest currently uses two different volunteer programs to monitor trail conditions. The first is the Trail Ambassador Program, sponsored by the Friends of Northern Arizona Forests. Currently volunteers conduct routine patrols on trails in the Flagstaff area. These patrols consist of visitor contacts as well as documenting trail conditions and needs. Trail Ambassadors currently consist of non-motorized modes of travel including equestrian, mountain

bicycle, and foot. The Trail Ambassadors do monitor and patrol portions of motorized trails like the Fort Valley Trail System.

The OHV Ambassador (OHVA) Program is a strong statewide volunteer program. The goal of OHVA is similar to the Trail Ambassador Program: education through visitor contact while monitoring trail and route conditions. OHVAs typically work during events to patrol large areas, including motorized trail systems and designated forest roads. Both the OHVAs and Trail Ambassadors would be incorporated in monitoring the proposed trail system.

Summary of Effects to Alternatives

Following is a summary table of the effects to each action alternative. Supporting effects analysis is found in Chapter 3, Environmental Consequences.

Table 3: Summary of Effects to Alternatives

Resource/Issue to Compare	No Action Alternative A	Proposed Action Alternative B	Action Alternative C
Recreation	<p>Motorized Trails would not be designated or constructed. OHV and motorcycle use would continue legally operating on designated roads in the project area. 14 miles of roads would not be decommissioned.</p> <p>Under the Travel Management decision, it would be illegal for motorized trail enthusiasts to use unauthorized trails; instead they would be restricted to 129 miles of designated roads and 9 miles of designated trails (Munds Park system) in the Kelly project area.</p>	<p>Motorized recreation and experiences and opportunities would be increased.</p> <p>73 miles of trail would be designated and constructed for motorized use (36 for UTVs and 37 for OHV). Including construction of two trailheads.</p> <p>Decommission of 14 miles of closed road under the Travel Management Rule.</p>	<p>Motorized recreation and experiences and opportunities would be increased.</p> <p>Includes all effects of Proposed Action, including an additional 14 miles of motorcycle trail and 9 miles of OHV trail providing loop opportunities and a trials segment.</p> <p>Open Forest Road 9462A.</p>
Scenery	There would be adverse to scenery.	Construction of approximately 33 miles new trails would result	Construction of approximately 45 miles new trails would result in

Resource/Issue to Compare	No Action Alternative A	Proposed Action Alternative B	Action Alternative C
		in localized scenic impacts primarily in the area east of Munds Park. Overall landscape character and scenic integrity would be improved as unauthorized trails re-vegetate and are not apparent to the casual observer.	localized scenic impacts primarily in the area east of Munds Park and southeast of the Pulliam Airport. Landscape character and scenic integrity would be improved as unauthorized trails re-vegetate and are not apparent to the casual observer.
Soils	Erosion of soil would continue to occur at some level over the next decade on 25 acres from 14 miles of road that would not be decommissioned.	There would be a net reduction of soil erosion from revegetation of 3 acres of soils from road to trail conversions even when factoring in new trail and parking lot construction. This alternative would also result in a reduction in soil erosion to 25 acres from 14 miles of road decommissioning over the next 10 years.	There would be a net reduction of soil erosion from revegetation of 3.9 acres of soils from road to trail conversions even when factoring in new trail and parking lot construction. This alternative would also result in a reduction in soil erosion to 25 acres from 14 miles of road decommissioning over the next 10 years.
Hydrology	Current conditions would continue. Roads proposed for decommissioning under Alternatives B and C would not occur. These roads would continue to deliver sediment downstream for at least a decade while the road naturally revegetates.	There would be a net decrease of 1,543 pounds of sediment resulting from proposed trails and road decommissioning that could affect downstream water sources. This net decrease in sediment is expected to move toward water quality improvement in all watersheds and decrease mercury levels in Lower Lake Mary.	Similarly to the Proposed Action, Alternative C would not pose a risk to riparian area function and downstream water quality including impaired waters in Upper and Lower Lake Mary and Oak Creek because of adequate design features and implementation of BMP's. Alternative C would decrease overall sediment delivery to Oak Creek and Lower Lake Mary watersheds
Wildlife	<u>Mexican Spotted Owl</u> Roads within restricted and	<u>Mexican Spotted Owl</u> Ground disturbance from new trails would not impair the local	<u>Mexican Spotted Owl</u> Effects are the same as Proposed Action.

Resource/Issue to Compare	No Action Alternative A	Proposed Action Alternative B	Action Alternative C
	<p>protected Mexican spotted owl habitat that would be decommissioned in Alternative B and C would continue to be administratively closed only under TMR.</p> <p><u>Northern Goshawk</u> No direct or indirect effects.</p>	<p>habitat from functioning as prey and MSO supporting habitat nor remove key habitat components.</p> <p>Positive effects on MSO by decommissioning roads in MSO Protected Activity Centers (PAC).</p> <p><u>Northern Goshawk</u> May impact individuals but is not likely to result in a loss of viability or trend toward federal listing.</p>	<p>The small increase in mileage would not represent a substantial increase in noise or visual disturbance to MSO as compared to the Proposed Action.</p> <p><u>Northern Goshawk</u> May impact individuals but is not likely to result in a loss of viability or trend toward federal listing.</p>
Heritage	No direct or indirect effects.	<p>If any cultural resources are detected during surveys, sites would be avoided.</p> <p>Managing use on designated system trails, open roads and identified trailheads tends to minimize damage and degradation of cultural resources.</p>	Effects would be the same as the Proposed Action.
Botany	<p><u>Threatened and Endangered Species</u> There will be no effects to TES because the project area does not contain suitable habitat.</p> <p><u>Noxious/Invasive Weeds</u> Under the No Action Alternative, negative impacts to sensitive habitats would remain the same or potentially</p>	<p><u>Threatened and Endangered Species</u> There will be no effects to TES because the project area does not contain suitable habitat.</p> <p><u>Noxious/Invasive Weeds</u> Decommissioning approximately 14 miles of closed routes reduces roads density, the number of vehicles in an area, which reduces the potential spread of invasive or noxious weeds.</p>	<p><u>Threatened and Endangered Species</u> Same as No Action</p> <p><u>Noxious/Invasive Weeds</u> Same as Proposed Action</p> <p><u>Region 3 Sensitive Plants</u> Same as Proposed Action.</p>

Resource/Issue to Compare	No Action Alternative A	Proposed Action Alternative B	Action Alternative C
	<p>increase over time.</p> <p><u>Region 3 Sensitive Plants</u></p> <p>This alternative increases the greatest risk to sensitive plants affected by routes within 200 feet of areas by infestations of noxious and invasive weeds.</p>	<p>Construction of trails would be a potential increased risk of introduction of noxious or invasive weeds to uninfested areas, although these effects would be mitigated by following the Best Management Practices as identified in the design features.</p> <p><u>Region 3 Sensitive Plants</u></p> <p>Impacts to Flagstaff Pennyroyal (<i>Hedeoma diffusum</i>) and Arizona sneezeweed (<i>Helenium arizonicum</i> may occur), however, the overall effect may be beneficial by reducing direct and indirect impacts through mitigated efforts.</p> <p>Not likely to result in a trend toward federal listing or loss of viability.</p>	
Economics	Would not result in any economic impact to the local economy.	Motorized recreation in this area may decrease the satisfaction of some Forest users who hike in the project area. It is expected to have a larger increase in satisfaction and thus consumer surplus for motorized recreation enthusiasts, especially those who prefer single track trails.	Same effects as the proposed action.
Range	Existing Range conditions would continue.	Cattle would become accustomed to noise and have no effect on livestock production.	Same as effects to the Proposed Action.

Resource/Issue to Compare	No Action Alternative A	Proposed Action Alternative B	Action Alternative C
Wildfire Risk	No effect.	Not likely to result in a measurable increase in acres burned from human ignition in or adjacent to the project area.	Same as effects to Proposed Action.

Chapter 3 - Environmental Consequences

This chapter provides information concerning the affected environment of the Kelly Motorized Trail Project area, and presents the scientific and analytical basis for comparison between the No Action Alternative A, the Proposed Action B, and Action Alternative C, including direct, indirect, and cumulative effects. Direct effects are caused by the alternative under consideration and occur on site and affect only the area where they occur. Indirect effects are caused by the alternative and are later in time or farther removed in distance, but are still reasonably foreseeable. Cumulative effects include the impacts on the environment which result from the incremental impact of the alternative when added to other past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such other action (40 CFR § 1508.7). The means by which potential adverse effects would be reduced or mitigated are described in the Design Features listed in Chapter 2.

Effects are quantified where possible, and qualitative discussions are also included. This summary of the effects analysis is organized to first focus on those resources directly related to the purpose and need, and the issues defined by scoping and analysis. Brief summaries of additional analyses follow. The Project Record for the Kelly Motorized Trail Project includes all project-specific information, including resource specialist reports, watershed analyses, and other results of field investigations (accessible at the Flagstaff Ranger District). More detailed information on the methodologies used for analysis, existing conditions and anticipated effects can be found in the resource specialist reports located in the Project Record.

Recreation

This section describes the affected environment and environmental consequences for the Recreation resource within the analysis area. It also describes the anticipated effects of both action alternatives on noise generated by motorized users and impacts to non-motorized users, issues identified during the public scoping process (see *Issues* section).

EXISTING CONDITIONS

Forest System Trails

Like most areas of the Flagstaff Ranger District, the Kelly Motorized Trails Project Area (project area) sees high amounts of recreational use both from nearby neighborhoods and overnight visitors from other areas of Arizona. The project area is unique because unlike a majority of the district, there are few managed recreation facilities or trails. The only recreation sites in the area include a day-use climbing area and two trailheads; one designed for snowmobile access in the winter and another for motorized access to the Munds Park Trail System. Forest System trails in the project area include the Munds Park Trail System, which includes 9 miles managed for vehicles less than 50 inches wide and 3.5 miles managed for non-motorized use.

The Pinewood-Mormon Lake Snowmobile System passes through a majority of the project area. The system mainly uses major forest roads to create a system of loops connecting the communities of Mountainaire, Munds Park, and Mormon Lake by snowmobile. The entire snowmobile system totals 54 miles and for the most part only consists of routed wood directional signage at forest road junctions. The system includes a couple access points and one trailhead. Winters in the project area usually bring enough precipitation in the form of snow to close most roads to wheeled travel. The decision is made locally to close roads for public safety; this is done with a system of gates and barricades. Although the roads may be closed, there is not always enough snow for gratifying snowmobiling, and snowmobile use in the project area is relatively light.

Dispersed Recreation

Perhaps the most widespread form of recreation in the project area could be described as dispersed recreation. The Coconino National Forest Land and Resource Management Plan (1987, as amended) defines dispersed recreation as recreation use that occurs outside of developed sites and requires few, if any improvements other than roads and trails. This includes dispersed camping, driving for pleasure, hiking, and OHV use. There are approximately 37 miles of road designated as camping corridors, authorizing motor vehicle use for the purpose of camping up to 300 feet from the road. The remainder of the road system allows camping, but is restricted to parking alongside the road. Some areas are extremely popular for camping, including Ward Camp Park, Horse Park, and several other areas. Camping can come in a variety of forms including large Recreational Vehicles (RV), live-in toy haulers, and tent camping. 20 percent of visitors come from Maricopa County (Phoenix metro area) to escape extreme summer temperatures and enjoy the cool higher elevations of the project area (NVUM, 2010).

OHV and Population Growth

Over the last two decades, Arizona has seen a dramatic increase in population (Table 4). The entire state of Arizona has grown almost 75% from 1990 to 2010; the population of Flagstaff has also grown approximately 43% in that same time (U.S. Census Bureau, 1990- 2010). It can be assumed that the increase in recreation in the project area reflects this rapid population growth.

Table 4: Arizona Population Growth – U.S. Census Bureau

Year	Arizona	Coconino County	Flagstaff
1990	3,665,228	96,591	45,857
2000	5,130,632	116,320	52,894
2010	6,392,017	134,421	65,870
Percent of Growth (20 years)	74.4%	39.1%	43.6%

With the population growth, the OHV industry has also seen a dramatic increase in personal ATV and UTVS. Arizona Trails – 2010 reported 698 percent increase in sales of ATVs in Arizona between the years 1995 to 2006. In this same period of time off-highway motorcycles sales increased 460 percent (McVay et al, 2009). UTVs have been one of the fastest growing markets for motorsports retail sales. In a five year period national UTV sales grew over 62% from 100,000 vehicles sold in 2002 to 265,000 in 2007 (Crocker, 2007). Crocker points to several factors that have contributed to this impressive growth, including older OHV riders switching from ATVs to UTVs for smoother 4x4 models with independent suspensions: “In 2006, this older group may have accounted for as much as 20 percent of total consumer sales” (2007). Crocker expects this trend is likely to continue as “baby boomer” generations get older. These statistics compare well locally here in Arizona. Ride Now Motorsports, a major OHV dealer with eight locations in Arizona, reported a 45% increase in UTV sales in the last 3 years (Petrovich, 2012). In 2008 sales of UTVs surpassed that of ATVs in these locations.

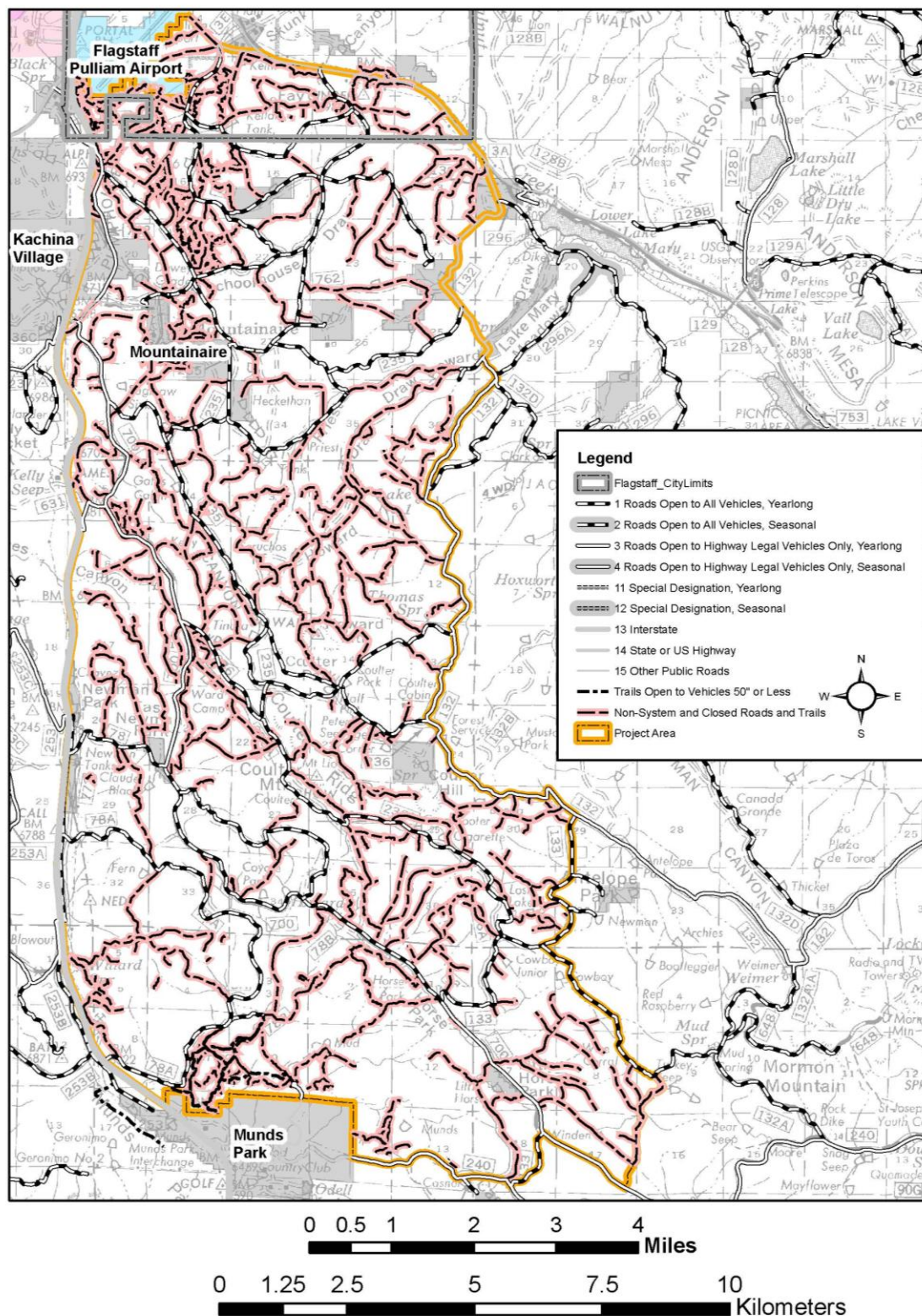
TMR, Existing, and Past OHV Use

As mentioned in the background section, the TMR for the Coconino National Forest has recently been implemented in the project area. This decision designated 39 miles of motorized trails and one designated off-road area on the Forest. In comparison to the 638 miles of non-motorized trails on the Forest the 39 miles of motorized trails is relatively insufficient. Even when combined with the 5.6 million acres of the three Northern Arizona Forests (Apache-Sitgreaves, Coconino, and Kaibab), there are only 92.5 miles off motorized trail and one designated off-road area. Specifically in the project area motorized use is restricted to 129 miles of roads and 9.3 miles of motorized trail. While the TMR decision policy is considered as part of the existing condition for this report, implementation of these restriction began fairly recently on May 1st, 2012. Because of this recent implementation, use of non-system trails and roads is anticipated to continue over the short-term (1 -3 years) while Forest visitors adjust to the new motorized travel system and policy, and while the Forest works to decommission and improve signage in the project area.

Motorized users on off-road vehicles are interested in a variety of trail types and scenery and prefer their riding areas to be away from buildings and roads (Crimmins, Tom. 1999. Colorado off-highway vehicle user survey; Summary of results. State of Colorado. Colorado State Parks OHV Program. 1-10 pp.). A more intimate and challenging experience is created when the driver has to interact with the environment by avoiding obstacles and confronting challenges that do not exist on a typical Forest roadway. That this is an important experience to motorized users is confirmed in numerous comments received by the Coconino National Forest (Coconino Trail Riders. Comments on Coconino National Forest Travel Management Proposed Action. September 7, 2007. 16 p.).

To meet the need for motorized recreation a successful motorized trail system should provide enough trail mileage to satisfy the majority of riders. This should reduce the desire for riders to leave the trail and create unauthorized routes. Wernex (1994), states managers “should attempt to provide 60 or more miles of trail in each trail system. Realize that expert riders may want to travel over 100 miles per day.” According to survey average trail rides use about 29 miles of trail , and the author suggests a minimum trail system should be at least 60 miles of connected trail (Crimmins, 1999). Desirable OHV recreation opportunities should include loop riding opportunities (Snyder et al, 2008; McVay et al, 2009).

Figure 5: Existing Non-System Roads and Trails in the project area



As discussed in the background, the project area has had an abundance of roads and unauthorized trails (see Figure 5). Surveys show approximately 313 miles of routes. These routes have been used by ATVs, UTVs, Off-highway motorcycles, and full sized vehicles. Some routes, like the Airport Trails have been used exclusively by motorcycles. It is clear that many of these routes including the Airport Trails continue to be used despite the new motor vehicle rules as visitors continue to be educated and the Forest continues to sign and decommission roads.

Figure 6: Trials riding at Central Arizona Trials event

Another motorized activity traditionally taking place in and nearby the project area is observed trials riding, practicing, and competition. Observed trial riding is a sub-sport of off-highway motorcycle riding, where specially built lightweight two wheeled cycles are driven up and over rocks and other natural obstacles on a route using balance, motor and power control, staying on a correct path, feet or hands not touching the ground, not rolling backwards, and not killing the motor while being judged. Historically,



organized observed trial riding events have been permitted in the project area, sponsored by Central Arizona Trials Inc (see Figure 6). The most recent event was permitted in 2009 east of Horse Park. Although trial riders probably do not represent a large percent of motorized users, they have been known to use a variety of locations in the project area to practice for organized observed trials event in other parts of Arizona and across the Western U.S. Central Arizona Trials Inc. usually organizes approximately a dozen events throughout Arizona (centralarizonatrials.org). There are no known specific heavily used or impacted trials areas in the project area; the trials use is likely spread over many desirable areas throughout the project area. With the TMR implementation there are currently no areas in the project open to this type of activity.

OHV Regulations

Although there are about 129 miles of designated roads in the project area, managing OHV use on National Forest System Lands can be complicated and involves the legal aspects of operating OHVs and motorcycles within the state of Arizona. Arizona State laws apply to drivers and their motor vehicles using National Forest System Roads. Many Forest System Roads are designated as “highway legal vehicles only”, thus requiring under Arizona State law all motor vehicles to be registered as highway legal vehicles. These roads generally include those roads designed for a moderate to high amount of traffic with improved road surfaces. In the project area there are approximately 40 miles of road open only to highway legal vehicles. Highway legal means the vehicle must have a license plate issued by the Arizona Department of Motor Vehicles beginning with the letters “MC.” This means the vehicle meets requirements and has appropriate required features. Operators of highway legal vehicles must carry proof of registration and insurance, and operators must possess a valid driver’s license.

Some Forest System Roads are not maintained to a public standard but are open to motorized travel; these are referred to as roads designated for all vehicles. Vehicles are not required to meet highway legal requirements, but are still required to have mandatory equipment including a license plate. These are referred to as “Title-Only” License Plates, denoted by the beginning letters “RV.” In addition to this required equipment, Arizona State law requires all OHVs operating on public and state land to have USDA Approved Spark Arrestor [Arizona Revised Statue (ARS) § 28-1179A.4] and a muffler or noise dissipative device that prevents sound above 96 decibels (dBA) during prescribed stationary sound testing (ARS § 28-1179A.3) Operators on these roads open to all vehicles are not required to possess a valid driver’s license. Currently in the project area there are approximately 89 miles of roads open to all vehicles.

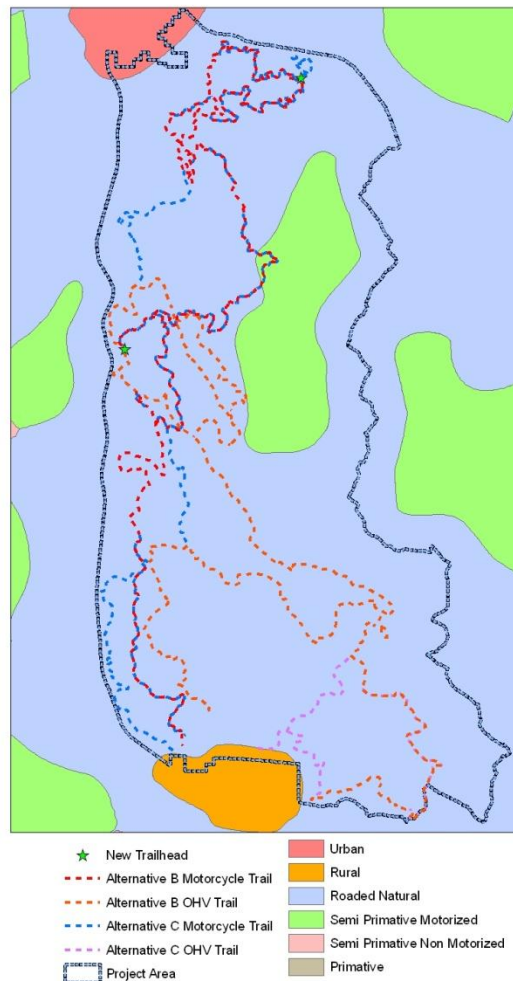
Few roads designated for all vehicles exist with desirable loop opportunities. Although there are 89 miles of roads designated for all vehicles in the project area, most make connections with roads open only to highway legal vehicles. This means groups with vehicles that are not highway legal or operators who do not possess a driver’s license have limited desirable riding opportunities in the project area. In the 2008 Random House Hold Survey, a majority (65%) of motorized users who responded claimed when they rode OHVs they did with children under the age of 16 (McVay et al, 2009). This shows that OHV users often use riding OHVs as a family activity; as such, having to use roads open only to highway legal vehicles is problematic for groups with riders under 16 years of age.

Recreation Special Uses

Several special use recreation events have been permitted in project area. The Rock Rabbit Classic was mountain bike race on roads and unauthorized routes in the Kelly Canyon area; this was last permitted in 2002. A motorcycle Observed Trials event was permitted most recently in 2009 in the Horse Park area. Other special use permits issued for the area include non-commercial group use for group campouts. These permits are generally issued in the summer and fall months.

Recreation Opportunity Spectrum and Management Areas

The ROS identifies 6 different spectrums or opportunities. These include Primitive (P), Semi-Primitive Non-Motorized (SPNM), Semi-Primitive Motorized (SPM); Roaded Natural (RN), Rural (R), and Urban (U) (USDA, 1986). The Kelly Motorized Trail Project Area includes large amounts of the RN spectrum; approximately 36,471 acres or 88% of the project area is RN. Ten percent of the project area can be classified as SPM. Rural and Urban spectrums make up the rest of the project area, each less than 1% of the project area (Figure 7). There are no areas designated as Primitive or Semi-primitive Non Motorized within the project area.

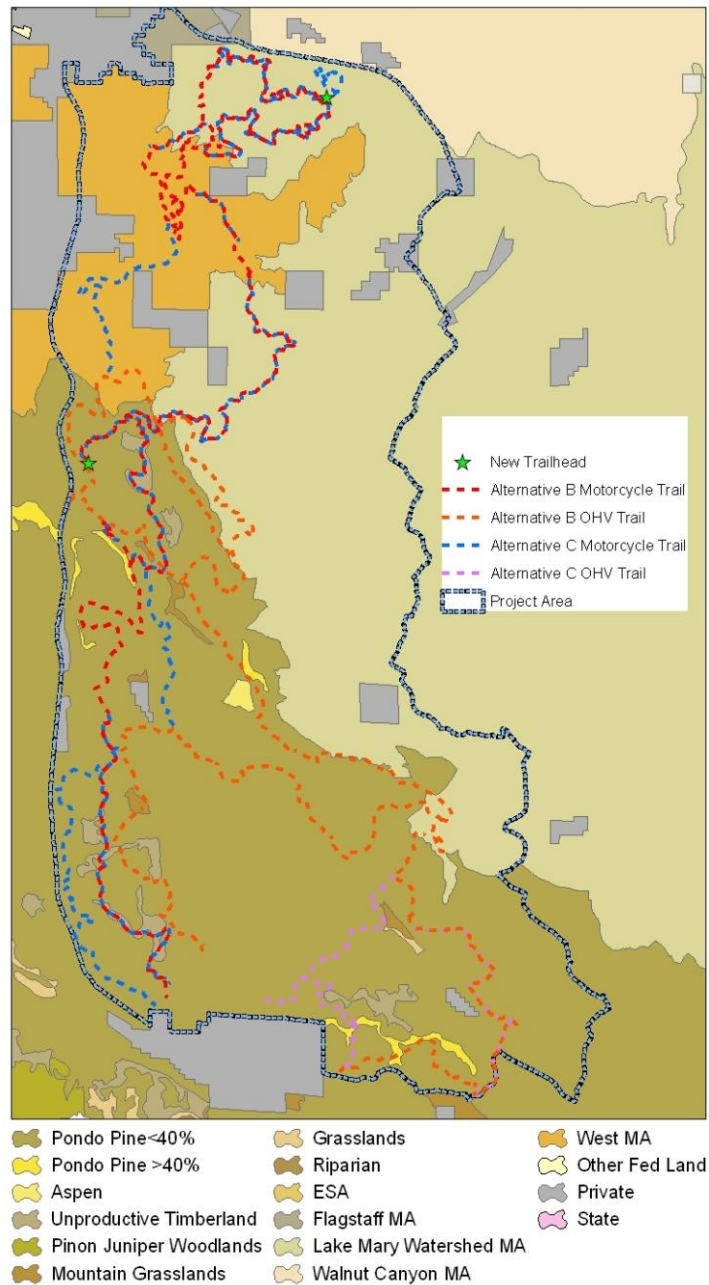
Figure 7: Recreation Opportunity Spectrum (ROS) and Proposed Trails

The project area encompasses several different Management Areas (MAs) identified in the Coconino National Forest Land and Resource Management Plan (1987, as amended). The large portion of the project area is MA 3, Ponderosa Pine and Mixed Conifer less than 40% Slopes: approximately 20,246 acres or 34 percent. MA 35, Lake Mary Watershed, makes up about 26 percent of the project area at about 15,398 acres, and MA 38 (West) makes up about 5,114 acres (9 percent) of the project area. Also small areas of several other MAs are within the project; these are all each less than 1 percent of the total area: MA 4, Ponderosa Pine and Mixed Conifer greater than 40% Slopes; MA 5, Aspen; MA 6, Unproductive Timber Land; MA 9, Mountain Grassland; MA 10, Grassland and Sparse Pinon Juniper above the Rim; and MA 34, Flagstaff (see Figure 8).

Amendment 17 of the Coconino Forest Land and Resource Management Plan identifies motorized trails with a goal of providing motorized trails that provide semi-primitive motorized experiences with connections to long distance opportunities. The plan goes on, “Convert some roads that are not needed for the road system into motorized trails. Some Maintenance Level II

roads may be used for portions of motorized trail routes”. Specifically in the Lake Mary Watershed MA 35, consider motorized trail corridors. The West MA 38 also identifies converting roads that are not needed for the road system into motorized trails, “balance demands for non-motorized and motorized trails and provide opportunities for both.”

Figure 8: Management Areas (MA's) and Proposed Trails



ENVIRONMENTAL CONSEQUENCES

Alternative 1 (No Action Alternative)

Direct and Indirect Effects

The No Action Alternative would not result in any designation or construction of OHV trails. OHV use would continue legally operating on designated roads in the project area. Off-highway motorcycles would continue to operate on designated roads. No roads or routes would physically be decommissioned. OHV recreation opportunities would consist of designated-open forest system roads in the project area.

It is expected that the road system would not serve as a desirable opportunity for OHV recreation, as designated routes specifically for ATV/ UTV are desired (Crimmins, 1999; Flood, 2006; USDA, 2008). The current designated system lack recreation opportunities designed for OHVs. The 2010 National Visitor Use Monitoring program found over 30,000 people visited the Coconino National Forest specifically to participate in motorized recreation (USDA 2011). This shows a need for motorized recreation and the current system does not provide recreation opportunities for this need. Crimmins (1999) found the average motorized recreationalist rode an average of 4.7 hours and covered an average of 29 miles. He suggested actually 60 miles of connectable trail should be used for a minimum motorized trail system so rides can be enjoyed throughout an entire day. This alternative does not provide any recreation opportunities like this and no satisfactory opportunities exist on the Coconino National Forest or on other Northern Arizona Forests (Kiabab and Apache-Sitgreaves National Forests).

Without a desirable and designated system of routes and trails, OHV users' incentives to remain on a designated road would likely weaken (Vail & Heldt, 2004). As OHV users make a decision to ride on designated roads in the project area or to explore the hundreds of other miles of unauthorized routes, it can be assumed a percentage of OHV users would decide to violate the existing MVUM and travel off of designated roads in the project area. Increased enforcement would be required to deter this use.

The Munds Park Trail System would continue to be the only designated motorized trail system in the project area. As enforcement and education increases through implementation of the MVUM, it can be expected OHV users would concentrate on the system as it is the only legal trail system. This congestion would put pressure on the nine miles of trail. This could lead to trail deterioration from overuse, increased probability in accidents and hostile user encounters (Dolesh, 2004).

In a sound analysis of the project area, the current system of roads and trails has some impacts on other recreation areas and private land in vicinity. The community of Mountainaire likely experiences an average of 41 decibels (dBs) and Munds Park experiences 42 dBs on average. This is about the sound a typical rain storm would produce (www.dangerousdecibels.org). Two non-motorized trails were analyzed to investigate the potential impact from roads and trails in the project area. The Crystal Point trail near FR 240 experiences an average of 35 dBs and Priest Draw trail has an average of occurrence 32 dBs based on motorized use on designated roads. This is the sound a normal conversation would produce (www.dangerousdecibels.org). These sound impacts would not change under this alternative. Sound impacts are discussed in further detail in the GIS Sound Analysis Report found in the project record.

Cumulative Effects

Cumulative effects for this project include past, present, and foreseeable project for the next 25 years within the Flagstaff Ranger District as well as other National Forests within Northern Arizona, including the Kaibab, Tonto, and Apache-Sitgreaves National Forests. A list of Cumulative Effects can be found in Appendix C. Likely the largest impacts to recreation are from the Coconino National Forest Travel Management Decision (2011). This decision consolidates dispersed motorized camping and motorized recreation within the project area to specific open roads and corridors. In addition, effects to recreation would come from forest restoration projects including timber sales, fuels reduction, and prescribed fire projects.

The no action alternative would have cumulative effects on other areas of the Flagstaff Ranger District. The project area would include no miles of trail designed for off-highway motorcycles, and the 20 miles of the Fort Valley Trail System would remain the only single track trail open to motorcycles. Just like the Munds Park Trail System similar effects can be expected for the Fort Valley Trails. This will continue to be the only desirable riding for motorcycles. Increase in motorcycle use is probable, and with the congestion increases in user conflicts, accidents, and trail condition declines are possible.

Cumulative effects to motorized recreation opportunities are based on other activities that would limit motorized recreation opportunities in other areas of Northern and Central Arizona over the next several years. As discussed the Coconino National Forest Travel Management Decision greatly reduced motorized recreation on the Coconino National Forest. Similar efforts to restrict off-road vehicle use and designation of a route and trail system on adjacent and nearby public lands including the Kaibab, the Apache-Sitgreaves, and Tonto National Forests, and the Havasu Field Office of the Bureau of Land Management (BLM) have recently or are likely to occur in the next several years. This would result in a cumulative effect of increasing the concentration of motorized recreational users and thus crowding along designated routes and areas. The more public lands that apply these restrictions, the greater the magnitude of crowding along these designated routes and areas. In most situations this cumulative impact would result in a decrease in satisfaction from those who desire motorized recreation opportunities.

Alternative 2 (Proposed Action)

Direct Effects

Full implementation of the proposed action would increase the mileage of forest system trails on the Flagstaff District by 73 miles. These 73 miles would result in an increase of approximately 36 miles of trail specifically designed for UTVs and 37 miles of trail specifically designed for off-highway motorcycles. Two trailheads would be created to facilitate access onto the trail system. This would likely meet the demand of OHV riders, according to surveys average trail rides use about 29 miles of trail, and the author suggests a minimum trail system should be at least 60 miles of connected trail (Crimmins, 1999). Thus this alternative would have the effect of establishing an appropriate motorized recreation opportunity that would meet basic OHV user preferences in the northern Arizona area. By providing this opportunity for appropriate motorized recreation, Forest visitor satisfaction would be increased for at least 30,000 Forest visitors, who indicated that OHV use and motorized trail riding is their main activity on the Forest (USDA Forest Service 2012).

Recreation Opportunity Spectrum (ROS)

The addition of these trails into the project area meets the objectives identified for the existing ROS condition. The mileage of trail proposed is as follows: RN - 71.8 miles, SPM – 1.2 miles, (see Table 5). Most of the proposed action is in the RN spectrum, and the variety of the trail system would provide for appropriate access, experience, encounters, information, and facilities. Only 1.6 percent of the proposed trail system would pass through SPM. The trail would not affect this spectrum.

Table 5: Trail Mileages for each Alternative in ROS settings

Action	Roaded Natural	Semi-Primitive Motorized
Alternative A No Action	0	0
Alternative B Proposed Action	71.8 Miles 98.4%	1.2 Miles 1.6%
Alternative C	94.8 Miles 98.8%	1.2 Miles 1.3%

Dispersed Camping Corridors

Approximately 4 miles of proposed trails would pass through dispersed camping corridors; these 4 miles of trail affect approximately 10 percent of camping corridors in the project area. It is expected this could impact forest visitors using these dispersed camping corridors. The main impacts could be increased noise from OHVs as well as increased intensity of dust particulates. Many of the OHV trail routes passing through camping corridors are on roads open to all vehicles; thus the impacts of sound and dust are preexisting at some level. The increased impacts to camping opportunities by designating OHV trails through these areas is difficult to quantify because although an increase may be expected, there are many nearby designated dispersed camping corridors and spur roads that can be used as substitutes by campers who prefer to camp away from motor vehicle noise. Currently these roads are being used as routes for OHVs in groups and with families. Studies have shown that specifically designating areas for OHV use has the effect of decreasing conflict between campers and OHV users (Fillmore and Bury 1978). Thus, while approximately 4 miles of dispersed camping corridors may be impacted by increased motor vehicle noise and dust, providing a designated motorized trail to facilitate a satisfactory motorized recreation experience is expected to reduce conflict overall between those who come to the Forest to participate in dispersed camping and those that come to the forest for motorized recreation as their main activity.

Arizona State Parks found that 83 percent of motorized users in the state camped at least once in the last year in conjunction with motorized activities (McVay et al, 2009). According to this survey it is likely that many users of the proposed trail system would seek camping opportunities while using the trail system. By having the trail system pass through different camping corridors, there would be opportunities for OHV users to camp near trail access points. This opportunity for OHV users to access trails from dispersed camping corridors could reduce impacts to other campers. Currently, to achieve desired riding opportunities in the project area, OHV users must travel through many miles of camping corridors using designated roads; under Alternative B, OHV users camping in dispersed camping corridors would be able to gain trail access and leave the camping corridor more quickly instead of traveling along corridors for many miles. In many

cases, this would actually reduce the number of camping corridor miles an OHV user would pass through to attain a ride of desirable length.

Multiple Uses of Motorized Trails

All motorized trails designated and constructed would remain open to all forms of non-motorized transportation including foot, equestrian, and bicycle. During initial public scoping of this project, concerns were voiced about allowing the use of both motorized and non-motorized uses in the same trail corridors. Although the trails would be designed for either off-highway motorcycles or UTVs, non-motorized use would be allowed to meet with the Forest Service goal of multi-use. Trails designed for UTVs would likely be less desirable for most non-motorized users as non-motorized users are known to desire a trail experience with a narrower corridor and so use would likely be low. Proposed trails designed for motorcycles would likely be attractive for some non-motorized users, especially mountain bikes. This has been shown on other trail systems.

The best parallel for this situation may be the Fort Valley Trail System, which includes 20 miles of trails popular for motorcycle use. Because of the proximity to the city of Flagstaff and the non-motorized Mt. Elden Dry Lake Hills trail system, mountain biking and hiking have also become popular. In addition some equestrian use has been observed on the trail system. Several non-motorized recreation events have been permitted on the trail system. With this high level of recreation use and mixed activities some user conflict would be expected; however in discussions with trail managers and users groups, no major user conflicts or safety issues have been reported. Like the proposed Kelly trail system, the Fort Valley trail system was largely constructed using volunteer labor. These volunteers consisted of a variety of trail users including motorcycle and mountain bike riders. By working closely together to construct a desired trail experience by both user groups, many social barriers may have been broken down. Local mountain bikers and hikers now may be more amenable or sensitized to the noise and interaction with motorcycles.

Local equestrian groups have noted that a horse and rider who are accustomed to riding nearby OHVs would rather share trails with motorcycles than mountain bicyclists (S. Walsh, personal communication, December 9, 2011). One reason for this was noise; horses can hear motorcycles from far off and know they are traveling their direction. If the horse knows a vehicle is coming it is less likely to be spooked and throw a rider. Conversely, it has been shared that when a mountain bike approaches a horse there is much less sound notification and a horse is more likely to be startled, potentially causing injury to a rider.

Several design features of trails and support facilities can also help reduce user conflicts and safety concerns. The first begins with education; motorcycle riders have repeatedly mentioned if more non-motorized users knew they were likely to encounter a motorcycle on the trail system, they would be less likely to have negative recreation experience when they encountered a motorcycle (Wernex 1994). This has been reported on the Fort Valley Trail System, and trail managers have increased signage notifying users that trails were multiple use and open to motorcycles. Although no figures are available, this has thought to reduce user conflict.

The second design feature that can reduce user conflict and increase safety is trail layout; by designing trails that incorporate numerous twists and curves with tight corners, the opportunity for speed is reduced. This reduces the speed at which motorcycle encounter non-motorized users, which also increases safety by reducing motorcycle stopping distances and diminishing risks of

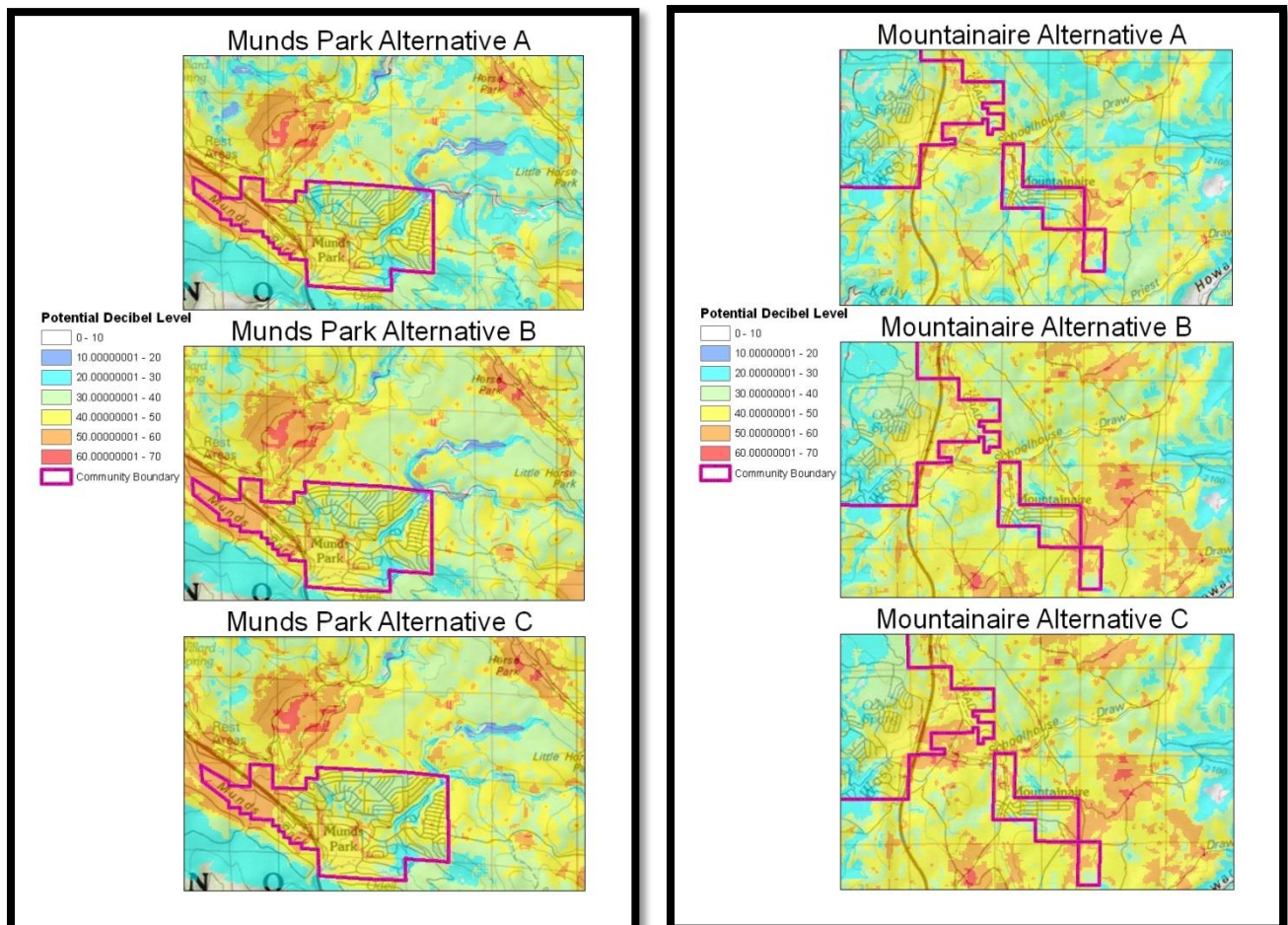
collisions. In addition, well-designed trails can actually absorb a greater number of users (Reichart, 2010). One other effect of designing trails with narrow, winding tight corners is that reduced speed also results in reduced noise (Wernex 1994). Reduction of noise would also improve non-motorized user's recreational experience.

Sound Impacts

As with any motorized trail project, the sound impacts from OHVs are a concern. For this reason a GIS Sound Analysis (available in project record) was conducted to explore the effects sound could have on the existing condition. Noise can have effects on many different resources, traditional uses, and adjacent private landowners. This analysis addresses the noise impacts from OHVs on the proposed trail to traditional non-motorized users.

The Occupational Safety and Health Administration use a standard to protect workers from damage to the human ear (Harrison et al, 1993). This standard uses 90 dBA for an eight hour work day as the most sound the human ear can stand without damage over a 20 year work career.

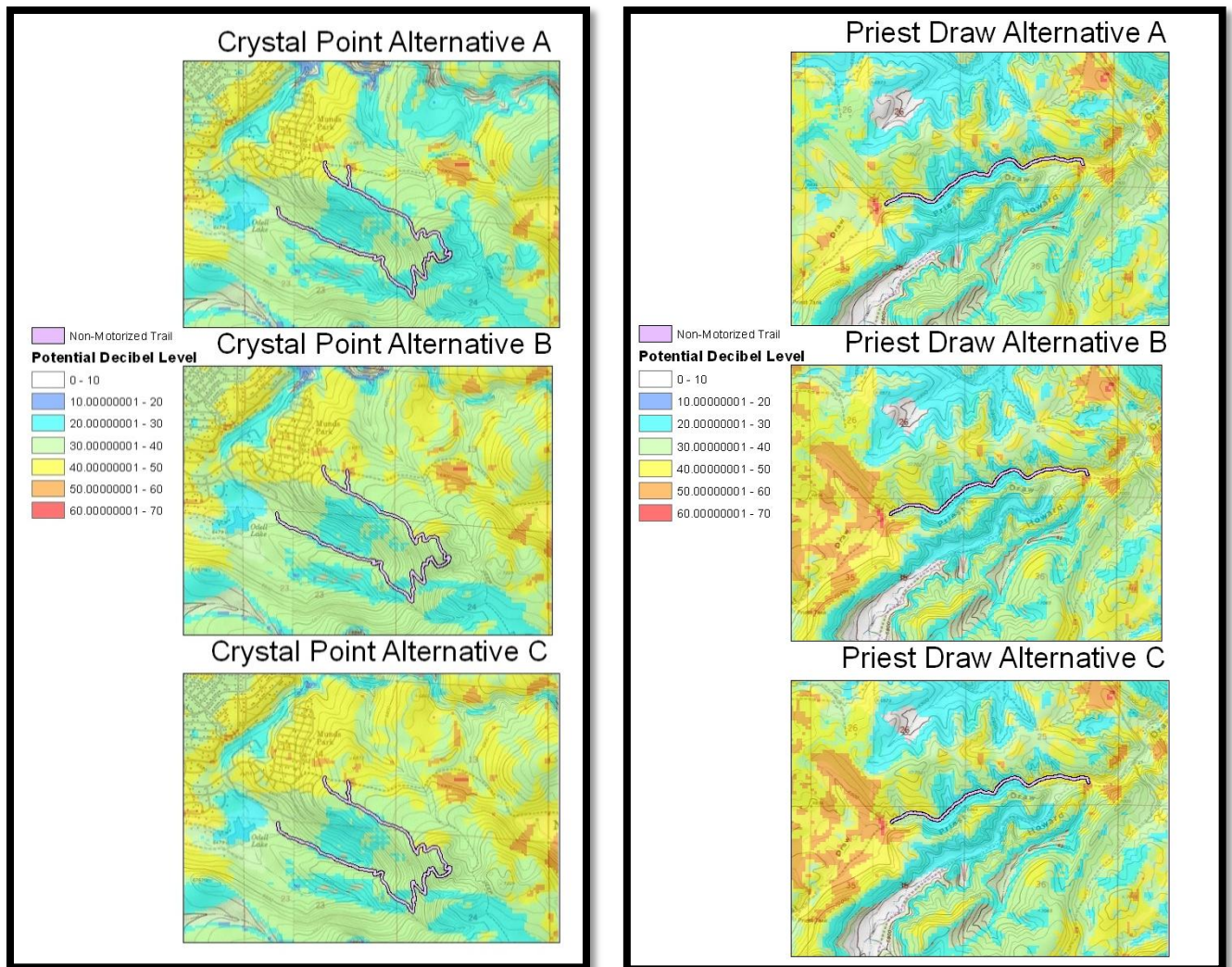
Figure 9: Sounds Impacts to the communities of Munds Park and Mountaineer



Based on GIS modeling, Figure 9 above represent the different audible sound levels produced by motorized vehicles on roads and trails in the project area. The Proposed Action produced an average of 43 dBA within the community of Munds Park and 43 dBA for the community of Mountainaire. This is an approximate 1 to 2 dBA increase in the average sound level from the existing condition. In fact there is so little change from the existing condition that the difference is likely unrecognizable to the human ear. 43 dBA can be compared to typical noise of rainfall.

The Figure 10 below represents sound effect associated with two non-motorized trails within or nearby the project area, Priest Draw and Crystal Point trails. Neither trail saw an increase in the average dBA from the proposed action versus the existing condition. Details on this analysis can be found in the GIS Sound Analysis located in the project record.

Figure 10: Sounds Effects on all Action Alternatives at Crystal Point Trail and Priest Draw Trail



Indirect Effects

For the entire Coconino National Forest the proposed action increases trails designed for UTVs by 100 percent, as there are currently no trails managed for UTVs; the proposed action would increase designated motorcycle trails by 64 percent. With this increase in motorized trail mileage it could be expected that pressures on other areas like Fort Valley Trail System and Cinder Hills OHV Area could decrease or remain static (as population and total amount of OHV users increase). This may reduce maintenance needs for Fort Valley because of reduced congestion.

Cumulative Effects

Cumulative effects for this project consider past, present, and future activities in the Northern and Central Arizona region for the next 25 years. A list of Cumulative Effects can be found in Appendix C. Over the past several years, there has been a number of travel management decision on nearby public lands including on the Kaibab National Forest and nearby Bureau of Land Management lands, which have restricted motor vehicle use and limited motor vehicle recreation opportunities. Other forests such as the Tonto National Forest and Apache Sitgreaves National Forest are undergoing the travel management planning process and are reasonably foreseeable actions likely to further restrict motorized recreational activities. While these actions have and will continue to result in a cumulative decrease in motorized recreation opportunities, the population and OHV use in northern and central Arizona continues to increase. Overall, these trends combine to increase a deficiency in motor vehicle recreation opportunities.

In addition to the trail limitations discussed above, The Four Forest Restoration Initiative (4FRI) and other restoration efforts would affect the project area including proposed trails. Many existing or proposed motorized trails may also be used as haul routes for timber harvesting activities. The trails may also be used as control lines for prescribed fire activities also associated with 4FRI. This would require coordination and possible temporary closures of trails depending on implementation, which could cumulatively combine to further limit motorized trail opportunities.

Alternative B would counteract this trend and combine cumulatively with at least two site-specific other reasonably-foreseeable motorized recreation planning projects (Highway 180 Motorized Trails and the Verde Valley Trails project) to provide appropriate recreational opportunities for motorized users to participate in legally. By providing appropriate and desirable motor vehicle opportunities, this alternative would also counteract the potential increase in user conflict on trails such as the Fort Valley Trail System resulting from a cumulative limitation of motorized trails and increasing trail use in the analysis area.

Alternative B would combine with other ongoing and future projects across the Forest that will decommission unauthorized routes, which would further aid in the implementation of TMR.

With ongoing motorized restrictions on the Coconino and other nearby public lands more crowding on designated routes may develop. Crowding could increase noise impacts to dispersed camping areas, but is unlikely to have cumulative effects to other non-motorized trail users. Cumulatively there are over 638 miles of non-motorized trail on the Coconino National Forest and adding motorized trail is not likely to lessen non-motorized opportunities forest wide. But implementation of Alternative B would increase the diversity of recreation settings generally across the Forest. The designation of motorized trails across the Forest would result in more

opportunities to find solitude, challenge and risk, natural quiet, and the absence of the evidence of human activity; setting attributes generally associated with more semi-primitive settings and activities. This would help move conditions toward forest plan objectives for recreation opportunity spectrum.

Alternative C

Direct Effects

The effects of Alternative C would be very similar to the effects from the proposed action. Under this alternative, 96 miles of OHV trail would be designated and constructed; 44 miles of trail, designed for UTVs and 52 miles designed for motorcycle. Compared to Alternative B this is an additional 23 miles of trail; 8 miles more designed for UTV and 15 more miles designed for motorcycle. Alternative C would incorporate additional loops and create limited out and back type trails, and would include a 1.5 mile technical trail section. Loop opportunities are highly desirable for motorized recreationalists (McVay et al, 2009; Wernex, 1994). In addition this alternative would identify 16 miles of trail for motorized recreation events. This alternative also identifies a forest road to remain open to all vehicles for connectivity in the project area. This alternative would likely have the most satisfactory recreation opportunities for motorized users as it contains additional mileage for an entire day of riding as well as loop opportunities, and connections (McVay et al, 2009; Wernex, 1994).

Recreation Opportunity Spectrum (ROS)

The addition of these trails into the project area meets the objectives identified for the existing ROS condition. Most of the proposed action is in the RN Spectrum, the variety of the trail system would provide for appropriate access, experience, encounters, information, and facilities. Only 1.6 percent of the proposed trail system would pass through SPM (table 5). The trails proposed in this alternative would not change this spectrum.

Dispersed Camping Corridors

Even with the addition of 23 more miles of trails than under Alternative B, is not anticipated that the effects to designated camping corridors would increase from the effects discussed under Alternative B as the additional mileage would not pass through additional designated camping corridors.

Construction and Maintenance of Trails

By adding mileage, especially in the form of increased loop opportunities, it can be expected that motorized use could disperse more effectively, reducing crowding along the trail. With the option of looped trails, a rider would rarely use the same segment of trail twice in the same visit. Without loop opportunities, a rider would use a segment of trail to get to a destination, then turn around and ride back the same trail. This essentially doubles the use on one segment of trail, which could lead to increased maintenance needs. Although the trail system would still require routine maintenance like all trails, loop opportunities may help decrease the frequency.

Additional mileage of trail would require additional funds for construction and maintenance. Compared to Alternative A and B, this alternative would require the most commitment of labor for construction and maintenance of the extra trail mileage.

Multiple Uses of Motorized Trails

This alternative is expected to have similar effects to non-motorized users as discussed in the proposed alternative. By increasing the mileage of the trail system in this alternative, it is reasonable to expect that both motorized and non-motorized use would be better dispersed throughout the system. With this dispersal, the interaction of all users would decrease compared to Alternative B. The same design features would be incorporated into this alternative to decrease negative social interactions as discussed in the proposed alternative.

Some additional user needs may be met by incorporating a technical trail with appropriate signage. This may satisfy the observed trials type riders, giving a population of motorcyclists a challenging place to practice skills and possibly a place to hold special use permit events. This would help reduce off trail or cross country travel for those motorcyclists wishing to practice observed trials activities. This specialized trail opportunity would increase the need for funding to support the construction and maintenance. Although this technical trail would not be exclusive to motorcyclists, it would likely be undesirable and inappropriate for other users such as mountain bikes and equestrians. This would likely reduce volunteer labor sources for maintenance and construction to only motorcyclists interested in this type of riding experience.

Sound Effects

Although additional mileage is proposed in this alternative, the sound impact from motorized vehicles would not significantly increase. The same average dBA would be experienced in the communities of Munds Park and Mountaineer as in Alternative B. This would also be the same for the two non-motorized trails analyzed for sound, Priest Draw and Crystal Point trails. These trails saw no increase in the average dBA from the No Action Alternative. This is shown in Figures 11 and 12, and in the GIS Sound Analysis in the project record.

Indirect Effects

For the entire Coconino National Forest, this alternative increases trails designed for UTVs by 100 percent, as there are currently no trails managed for UTVs, and increase designated motorcycle trails by 72 percent. With this increase in motorized trail mileage, it could be expected that pressures on other areas like Fort Valley Trail System and Cinder Hills OHV Area could decrease or remain static. This may reduce maintenance needs for Fort Valley because of reduced congestion.

By identifying areas for special use permit events like races and observed trials, motorized recreationists could more easily plan and conduct events on the District. This could be a sustainable location for these events and reduce the need for other areas outside of the project area for these types of events. Additionally, effects from these types of events could be more easily monitored and observed through the identification of specific areas for their permitting, thus ensuring that undue impacts to forest resources are not occurring.

Cumulative Effects

Cumulative effects for this project consider past, present, and future activities in the Northern and Central Arizona region for the next 25 years. A list of Cumulative Effects can be found in

Appendix C. The cumulative effects would be similar for this alternative as for Alternative B. Over the past several years, there has been a number of travel management decisions on nearby public lands including on the Kaibab National Forest and nearby Bureau of Land Management lands, which have restricted motor vehicle use and limited motor vehicle recreation opportunities. Other forests such as the Tonto National Forest and Apache-Sitgreaves National Forest are undergoing the travel management planning process and are reasonably foreseeable actions likely to further restrict motorized recreational activities. While these actions have and will continue to result in a cumulative decrease in motorized recreation opportunities, the population and OHV use in northern and central Arizona continues to increase. Overall, these trends combine to increase a deficiency in motor vehicle recreation opportunities.

Alternative C would also counteract this trend and combine cumulatively with at least two site-specific other reasonably-foreseeable motorized recreation planning projects (Highway 180 Motorized Trails and the Verde Valley Trails project) to provide appropriate recreational opportunities for motorized users to participate in legally. By providing appropriate and desirable motor vehicle opportunities, this alternative would also counteract the potential increase in user conflict on trails such as the Fort Valley Trail System resulting from a cumulative limitation of motorized trails and increasing trail use in the analysis area.

In addition to the trail limitations discussed above, The Four Forest Restoration Initiative (4FRI) and other restoration efforts would affect the project area including proposed trails. Many existing or proposed motorized trails may also be used as haul routes for timber harvesting activities. The trails may also be used as control lines for prescribed fire activities also associated with 4FRI. This would require coordination and possible temporary closures of trails depending on implementation, which could cumulatively combine to further limit motorized trail opportunities.

Alternative C would combine with other ongoing and future projects across the Forest that will decommission unauthorized routes, which would further aid in the implementation of TMR.

With ongoing motorized restrictions on the Coconino and other nearby public lands more crowding on designated routes may develop. Crowding could increase noise impacts to dispersed camping areas, but is unlikely to have cumulative effects to other non-motorized trail users. Cumulatively there are over 638 miles of non-motorized trail on the Coconino National Forest and adding motorized trail is not likely to lessen non-motorized opportunities forest wide. But implementation of Alternative C would increase the diversity of recreation settings generally across the Forest. The designation of motorized trails across the Forest would result in more opportunities to find solitude, challenge and risk, natural quiet, and the absence of the evidence of human activity; setting attributes generally associated with more semi-primitive settings and activities. This would help move conditions toward forest plan objectives for recreation opportunity spectrum.

Scenery

This section details the affected environment and environmental consequences for Scenery and visual resource management within the analysis area.

EXISTING CONDITIONS

Landscape Character

The Coconino National Forest (CNF) is a recreation destination for Arizona residents, adjacent states and travelers from the US and abroad. Coconino landscapes range from semi-arid desert to alpine tundra, making it one of the most varied landscapes in the area. People are drawn to the CNF for its open spaces, remoteness, tranquility, inspiring scenery, and cool climate that provides respite from desert heat.

The Kelly Motorized Trails Project (KMTP) lies within the Ponderosa Pine Landscape Character Zone (Hill and Boisseau 2011). Valued landscape attributes include ponderosa pine and pinyon-juniper woodlands, prairies and lakes. This landscape character zone is flat to gently sloping, with prominent hills and mountains in the northern portion of the zone and various escarpments throughout.

The existing landscape character is a result of direct and indirect human activities. The existing landscape character condition for the project area is a result of implementing the Forest Plan. Management of multiple resources has, to varying degrees, altered the natural landscape character. The most obvious effects on scenic resources within the project area are from vegetation and landform alterations. Resource management activities which have altered scenic resources include but are not limited to vegetation management, roads and trails, fire management (suppression and prescribed burning), and livestock grazing. Up until 2012 when Travel Management was implemented on the Coconino NF, the forest was open to cross country motorized travel except in specifically designated travel restricted areas. The growing numbers of motorized travel enthusiasts have created numerous routes in the project area that have further modified the natural appearing environment.

Vegetation in the project area is composed mostly of ponderosa pine forest, although there are some inclusions of pinyon-juniper and aspen. This area is valued for its continuous stands of ponderosa pine including large, mature trees called “yellow pines.” Shrubs, forbs and grasses form the understory of the forest. The forest floor is covered in most places with a layer of pine needles and duff. There are some places where bare soil is exposed such as in rocky areas, gopher holes, and where trees have blown over and the ground is disturbed and soil exposed. Contrast to the conical evergreen trees is provided by understory plants including wildflowers, grasses, shrubs and deciduous Gambel oak trees. Figure 11 and 12 below illustrates the ponderosa pine forest in the north and south portions of the project.

Figure 11: Ponderosa Pine Landscape in the Southern Project Area



Figure 12: Ponderosa Pine Landscape in the Northern Project Area

Patterns of the vegetation are moderate to fine-scaled, with few inter-tree openings. Visibility is limited through the forest. There are larger openings in the forest ranging from less than 1 acre to over a hundred acres in areas locally known as “parks” or “prairies.” The dominant scenic identity is the continuous coniferous forest, interspersed with parks/prairies that overlays the undulating volcanic and sedimentary landforms.

Landform in the project area includes location in the Colorado Plateau physiographic provenance. Formations include igneous basaltic lava flows and cinder cones, as well as sedimentary limestone formations. There are exposed limestone outcrops in the project area that add scenic interest, and some scattered basaltic outcrops.

Sense of Place

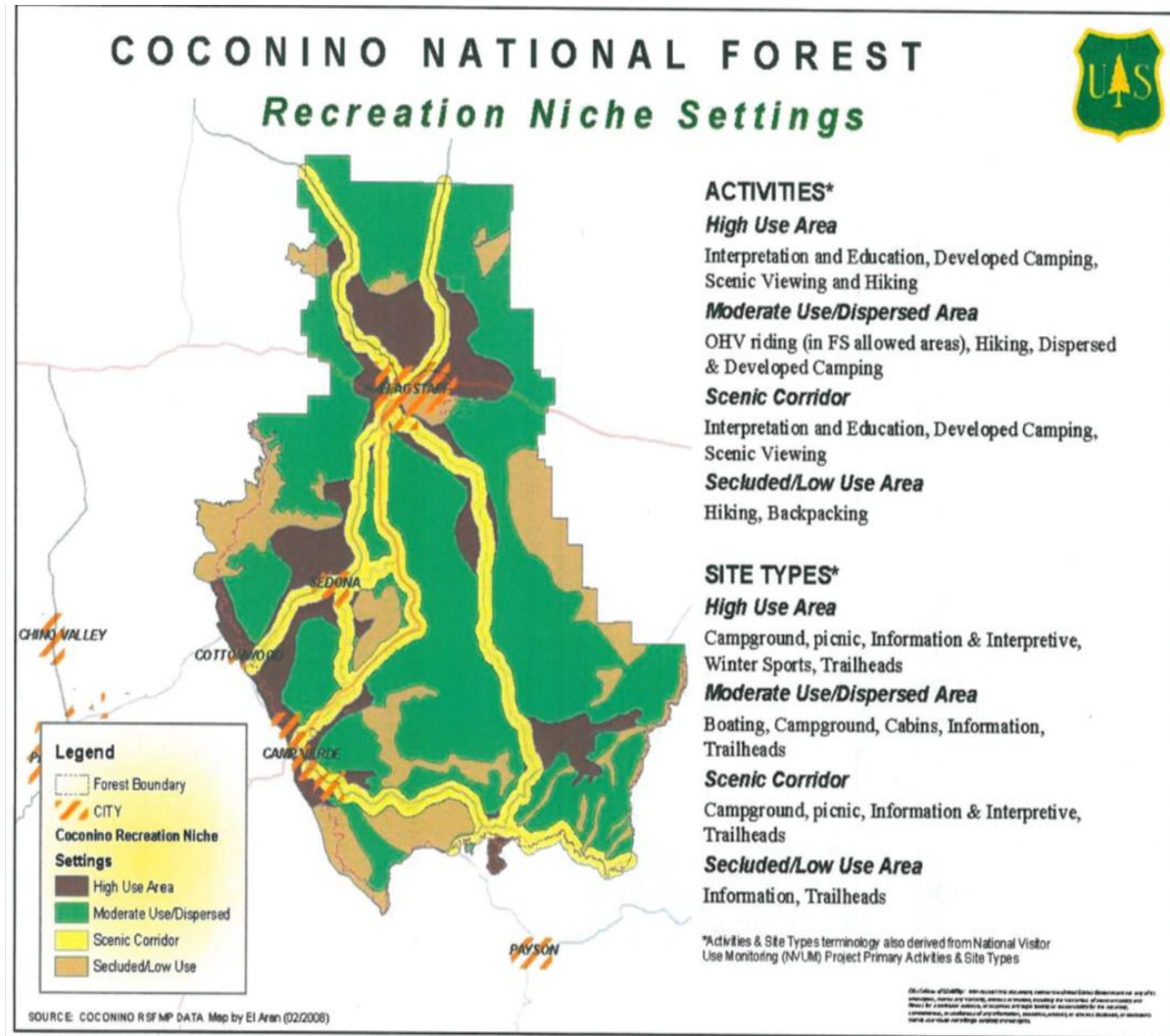
As part of a national Forest Service process, niche information was developed for the Coconino NF in 2008 (USDA Forest Service 2008). The niche acknowledges the importance of scenery, “The variety of landforms creates a changing viewscape seen from communities, trails and roads. The quality of life for local communities is enhanced by the scenery, clean water, and clean air.” It identified four settings: High Use, Scenic Corridor, Moderate Use/Dispersed, and Secluded/Low Use. The importance of scenic assets for recreation is included in the following descriptions and locations in Figure 13:

“The variety of landforms creates a changing viewscape seen from communities, trails and roads. The quality of life for local communities is enhanced by the scenery, clean water, and clean air,”

- Moderate Use/Dispersed – This less structured setting includes a lot of the vast open space of the Forest. From sparse vegetation to dense timber, canyons to plateaus and mountains this area typifies the Forest contrasting landscapes.
- Secluded/Low Use – Remote areas offer solitude and unconfined recreation. The area’s primeval character dominates and no permanent improvements exist. The Forest has 10 Wilderness areas, not all of which are in this setting.
- High Use - This setting includes Oak Creek Canyon, Mount Humphreys (the highest peak in Arizona), multiple lakes and East Clear Creek, which are all examples of high density use areas. Visitors to the Forest commonly experience a seamless shift from community trails and roads onto the Forest, without recognizing the change.

- Scenic Corridor – Visitors drive through the changing landscapes and view the spectacular scenery; by stopping at observation points they gain an understanding and appreciation for environmental ethics.

Figure 13: Coconino National Forest Recreation Niche Settings



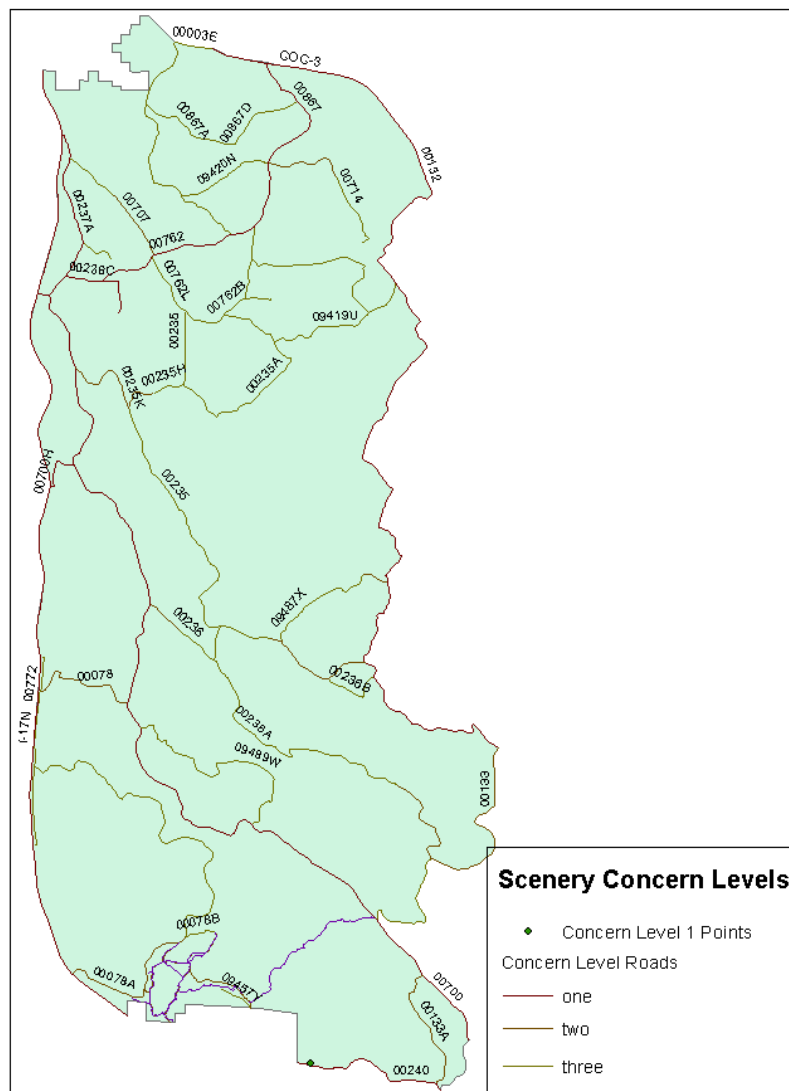
The KMTP falls within the Moderate Use/Dispersed category. Within this category, activities such as OHV riding, hiking, dispersed and developed camping are appropriate, and as are facilities such as trailheads. There are no designated Wildernesses in the project area.

Visibility

The project area is viewed at foreground, middleground and background distances, which represents the project area as seen from public use areas. For this project the public use areas include the designated system of forest roads and recreation sites. In order to determine visibility, distance zones of foreground (0-1/2 mile), middleground (1/2-4 miles), and background (4 miles

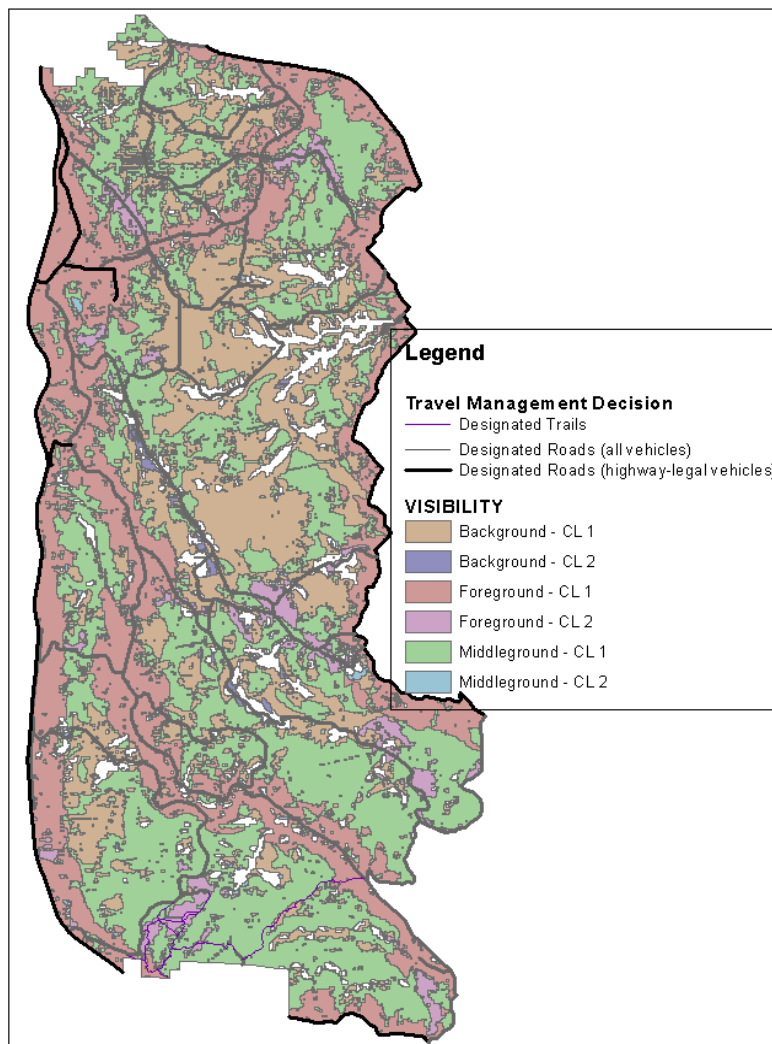
to horizon) are mapped (USDA Forest Service 1995). Next, concern levels that measure the degree of public importance placed on landscapes viewed from public use areas are identified. Per Scenery Management Handbook direction (USDA Forest Service 1995), primary travelways and use areas are of the greatest importance because they are most visible and receive the highest use. Secondary travelways and use areas are of local importance and receive moderate use. Tertiary roads are typically secondary roads with light travel and have low importance. Figure 14 shows the concern level mapping for this project. Note concern level 1 roads include Interstate 17 and Forest Highway 3 (Lake Mary Road), both bounding the project area; Forest Roads 700, 237A, 238C, 762, 867, 132 and 133; and one concern level 1 recreation site near the Munds Park community.

Figure 14: Concern Level Roads and Points



When the distance zones and concern levels are combined, a visibility map is produced that indicates the project area as seen from the public use areas (Figure 15). Roads open to highway legal vehicles only (the primary road system) are depicted in black; roads open to all vehicles are shown in dark grey. The TMR decision has changed the importance of some roads that are now closed to motorized travel (the amount of use and importance is lowered to concern level 3). The Munds Park designated trail system at the south end of the map is also shown. This motorized trail system has not been added to the forest level visibility map. The motorized trail system would have increased use and its importance may increase. The analysis of effects will take this into consideration.

Figure 15: Visibility map in Project Area



Existing Scenic Integrity

The existing ponderosa pine forest is much denser than it was historically. The existing understory vegetation is shaded by the overstory pine trees, making it less productive and sparser than it was under historic conditions. The amount of surface fuels (down trees, slash and

accumulated pine needles) is also thicker than it would be under a natural fire cycle. Historically natural fires occurred in the ponderosa pine type about every 3-10 years, but fire suppression activities have prevented the historic fire cycle from occurring. The historic fire cycle was characterized by frequent, low intensity surface fires which helped to thin the forest and maintain a healthy understory. Other vegetation management activities such as forest thinning have not occurred on a regular basis. Lack of fire and thinning has resulted in the dense forests we see today. Visibility through the forest is greatly reduced and it is often difficult to see narrow linear disturbances, such as trails, unless they occur in the immediate foreground, in open areas, or are visible on a fairly open slope. This area was included in the Mountaineer and Munds Park Fuels planning projects which as it is implemented will continue to result in forest thinning and prescribed burning.

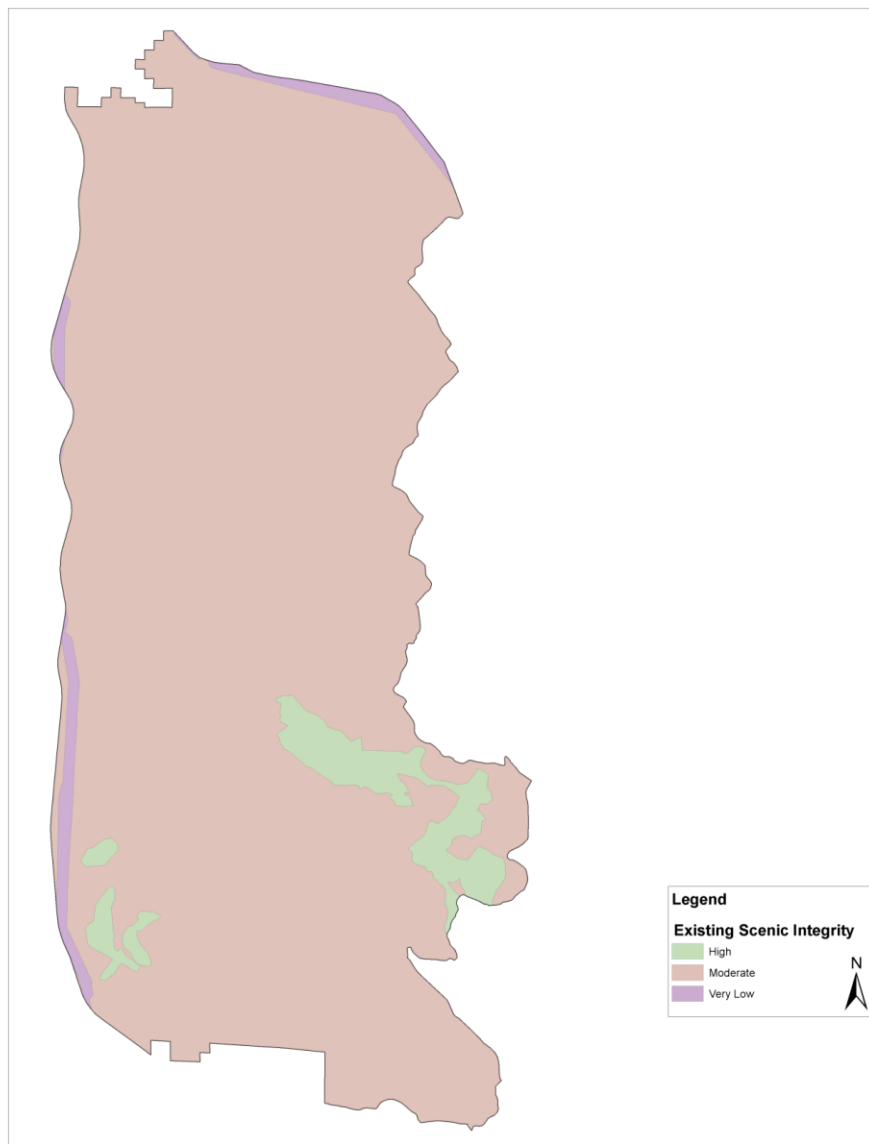
The primary changes in landform in the project have come from the construction of motorized and non-motorized routes as well as recreation developments. Major roads adjacent to the project area include Interstate 17 and Forest Highway 3 (Lake Mary Road), as well as 129 miles of Forest Roads as designated in the Travel Management decision (2011). There are two existing trailheads near Munds Park as well as constructed stock tanks and fences. There is a 9 mile designated trail system (motorized and non-motorized) near the community of Pinewood (Munds Park). There are about 1.8 miles per square mile of designated roads in the approximately 70 square mile project area.

In a 2008 survey of routes in the Kelly project, it was estimated that there were at least 313 miles of unauthorized trails. This means there are about 4.5 miles of unauthorized routes per square mile in the project area. The unauthorized trails have introduced a dense system of linear features into the landscape that were not naturally occurring and contrast with the adjacent scenery. Roads and trails result in the removal or destruction of vegetation including forest floor litter, exposure of bare soil, soil erosion and dust (USDA Forest Service 2008).

Recreation sites with cleared and surfaced parking areas (cinder/gravel) introduce contrast with the naturally occurring vegetation patterns. For example, natural vegetated openings such as prairies or parks are characteristic in the landscape and create contrast with forested areas, but are typical natural conditions in Northern Arizona. Cleared and surfaced openings are not naturally occurring.

The project area is adjacent to residential areas, including Mountaineer, Lake Mary Meadows and Munds Park. There are also scattered private land parcels within the project. Residential areas create contrasts to the characteristic landscape and introduce materials, shapes and forms that are not naturally occurring.

The existing scenic integrity map displayed in Figure 16 below provides the baseline from which alternatives can be compared and landscape character goals are developed. Much of the existing project area is mapped as moderate scenic integrity. This refers to landscapes where the valued landscape character appears slightly altered. Noticeable deviations must remain visually subordinate to the landscape character being viewed. The existing landscape character includes the overly dense ponderosa pine forest and sparse understory, many routes where linear features have been introduced in the landscape and places especially near communities where un-natural alternations have occurred.

Figure 16: Existing Scenic Integrity in the Project Area

There are small slices of very low scenic integrity along Interstate 17 and Forest Highway 3 (Lake Mary Road). These areas have had recent management activities that do not appear subordinate to the characteristic landscape and there are landforms changes such as high road densities, large cut slopes along the roads, and drainage and erosion control structures that have resulted in landscapes where the valued landscape character appears heavily altered. In addition, there are some cultural features such as signs and constructed features in these areas that deviate from the valued landscape character and vegetation management activities with unnatural appearing shapes and edges. There are also small areas of high scenic integrity where the valued landscape character appears intact. These places show low development and management activities have remained subordinate to the characteristic landscape.

ENVIRONMENTAL CONSEQUENCES

Alternative 1 (No Action Alternative)

Direct and Indirect Effects

Under the no action alternative, current management plans would continue to guide the management of the project area. No trails would be adopted or constructed, no roads or existing non-system trails would be decommissioned, and no roads would be converted to trails.

The current trail density of approximately 4.5 miles per square mile of unauthorized trails would continue to exist. Under the Travel Management decision, it would be illegal for motorized trail enthusiasts to use the non-designated trails; instead they would be restricted to 129 miles of designated roads and 9 miles of designated trails (Munds Park system) in the Kelly project area.

In the short term (immediately to 10 years), some of the unauthorized trails would be visible in the immediate foreground (0-300 feet) and foreground (0-1/2 mile) from high concern roads. For example, along FR 3E, the routes would be visible crisscrossing the area close to the road with linear features as illustrated in Figure 17.

Figure 17: Unauthorized trail in foreground



The ongoing effects of deviations in form, line, color, texture and pattern from the valued landscape character being viewed would continue until vegetation reestablishes on the non-system trails, which could take many years due to the compacted nature of the unauthorized trails and the climate of the area. The foreground vegetation is denuded, and soil is exposed in linear patterns. There is evidence of erosion due to bare ground exposure and destruction of vegetation and forest litter. The unauthorized trails decrease the existing scenic integrity from moderate to very low in foreground areas, where the deviations strongly dominate the valued landscape

character. The No Action Alternative would result in a decline of two scenic integrity levels and would not meet Forest Plan direction to “*Allow only one classification movement downward unless a larger movement is justified after doing an environmental analysis for emergency situations such as removal of fire damaged timber or I&DC control needs,*” (page number 60). This project does not constitute an emergency situation that would justify such a change.

In the long term (10-25 years), many of the unauthorized trails would begin to naturalize and plants would re-establish if they do not receive illegal use. There would be some places in the immediate foreground where the former trails would not be visible to the casual observer. In other places, there may still be evidence of denuded roadside vegetation, especially if forest users continue to park alongside the road in these disturbed locations or if they occur in a designated camping corridor and continue to receive camping use. In the long term, the existing unauthorized trails would have the effect of maintaining the existing compromised landscape character and existing moderate scenic integrity. No improvements would be made in either.

Cumulative Effects

Cumulative effects for this project are limited to activities within the project area for 25 years. The cumulative effects of this project when combined with effects from fire and fuels reduction projects and recreation projects (see Cumulative Effects project list in Appendix C) would result in some long-term and some short term effects. Short term denuded vegetation and soil exposure may occur along concern level 1 roads and trails as a result of fire constructed control lines and fuels reduction projects. These effects are similar to, but much less concentrated than unauthorized trail development. This alternative would result in long-term revegetation of many of the undesignated routes, which would partially counteract scenic impacts from vegetation management and recreation. In the long term, these areas impacted from vegetation management would become vegetated and would not be visible to the casual observer. The Travel Management decision may create some localized areas of impact in designated camping corridors along Forest Roads 867, 714, 3E, 707, 762L, 9419U, 132, 235K, 235H, 700, 78, and 133. Cumulatively, these effects may cause a decrease in scenic integrity in the immediate foreground along some roads in the project area. Beyond the immediate foreground (300 feet – ½ mile), and in the middle and background, there may be some increase in scenic integrity as a result of long term vegetation reestablishment and less evidence of linear features in the landscape.

Alternative B (Proposed Action)

Direct and Indirect Effects

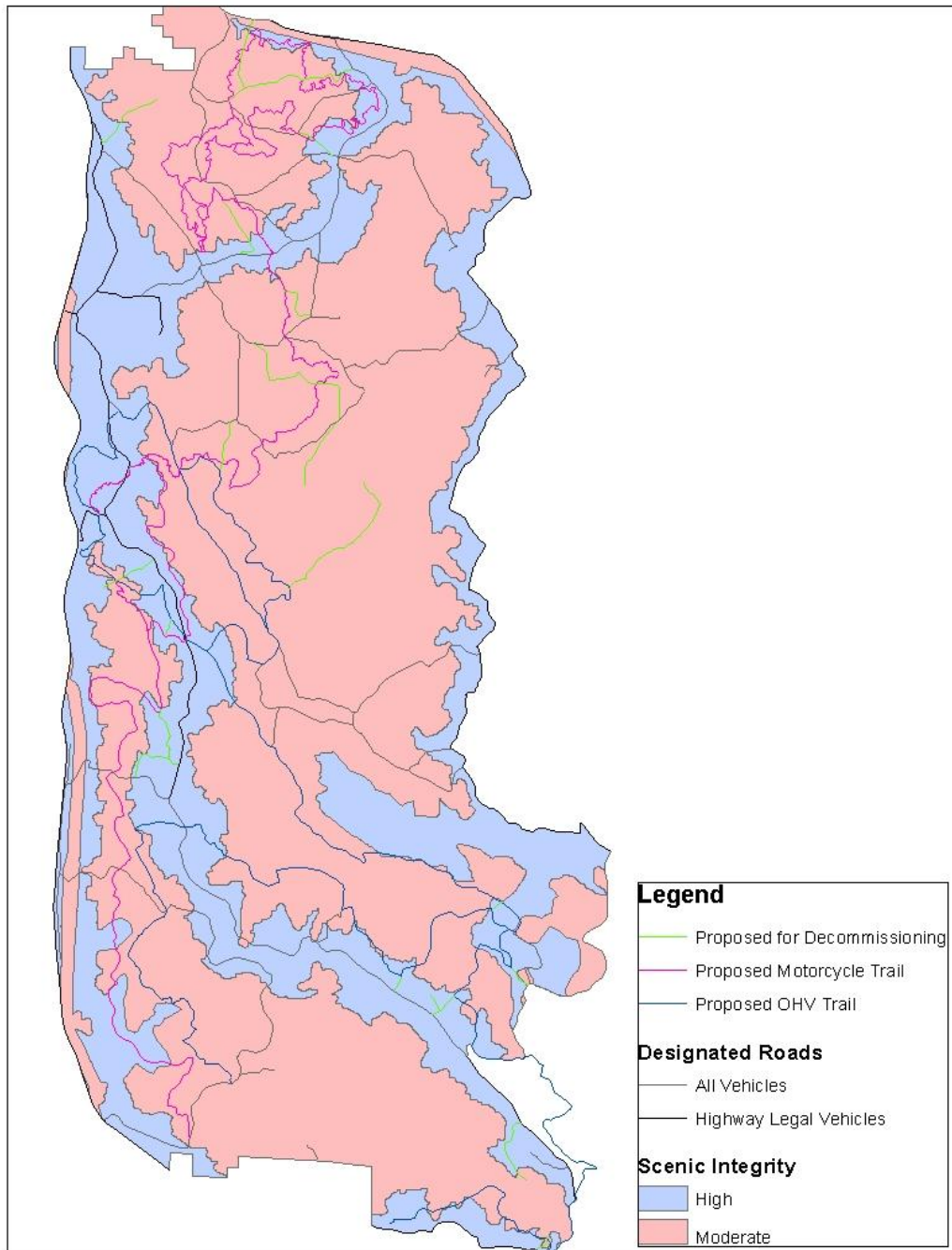
Alternative B would decrease the current unauthorized trail network by over 75%. Most of the proposed trails would be in areas of moderate scenic integrity objectives, or outside of the immediate foreground of high scenic integrity objectives as shown in Table 6 and Figure 18. Along the 129 miles of the designated road system, there are 53.1 miles of proposed motorized trail along concern level 1 roads, 16.2 miles along concern level 2 roads, and 28.8 miles along concern level 3 roads. Segments of some of these trails would be visible in the immediate foreground but the dense tree cover in the project area would obscure most disturbances of trails beyond the immediate foreground.

Table 6: Estimated miles by action within high or moderate scenery objectives

Action	Motorcycle Miles	OHV Miles	Total Miles	Moderate SIO	High SIO
Road to Trail Conversion	6	17	23	22	1
Adoption of Unauthorized Trail	6	--	<6	<1	6
Roads Open to All Vehicles	--	11	11	9	2
New Construction	25	8	33	25	8
Totals	37	36	73	56	17

The existing road system acts as the viewing platform for most users and is used to analyze the proposed actions. The eight miles of new trail construction will generally be located outside of the immediate foreground. Single track trails would not be visible from the existing road system except where the trail is immediately parallel to the road or perpendicular to the road so that it is possible to look down a straight portion of the trail. Linear trails create contrast to the surrounding landscape character and appear un-natural. In many places the rolling topography or vegetation would obscure the visibility of the single track.

The proposed eight miles of wider OHV trails would be more visible from the existing road system. A portion of these trails would be visible in the immediate foreground of roads in high SIO areas. The rolling topography and vegetation will help to obscure some of the trails from view. There will be slight decreases in scenic integrity as a result of new construction; however decommissioning the majority of the user created trail system will offset these changes. It is anticipated that there will be some overall improvement in scenic integrity throughout the project area.

Figure 18: Proximity of Proposed Action B to designated roads and related scenic integrity

Effects of trail construction include removal of understory vegetation and exposure of bare soil along 25 miles of motorcycle trails and eight miles of OHV trails. This would disturb approximately 14 acres. The new construction would affect less than 1% of the project area.

Road to trail conversion would occur on about 23 miles. The roadbed would be narrowed to accommodate either motorcycles (up to 36 inches) or OHVs (up to 62 inches). The unused portion of the road would be blocked off with natural materials. Over time the unused roadbed would naturalize and vegetate.

Approximately six miles of unauthorized routes would be designated as system trails. There would be no effects from adopting the trails, but there may be short term effects from adding drainage structures and other work to bring the trails to Forest Service standards.

There are no effects from using designated roads as part of the proposed trail system.

The proposed action would decommission 14 miles of undesignated road. This would reduce the unauthorized road density by about 75%. Scenic integrity would be improved in the long term as the unauthorized routes vegetate and are not apparent to the casual user.

The proposed action trail system crosses the following concern level 1 roads: Forest Road 762, 700, 700H and 867. It crosses the following concern level 2 roads: Forest Road 78, and portions of Forest Roads 236, 235, and 78A. In these locations, there would be evidence of vegetation removal, bare soil and route signing for up to ¼ mile depending on vegetation density and whether the trail is straight or curving (curving trails would disappear sooner). In addition, the proposed action trail system parallels a combined total of approximately 4 miles of Forest Road 700 (concern level 1), though not consecutively, and may be visible in the immediate foreground depending on vegetation density and whether the trail is straight or undulates closer or farther from the road. This also occurs along Forest Road 867 (concern level 1) for approximately 0.1 mile. The remainder of the trail system would be located outside of the immediate foreground and in middle and background visibility areas that would not been seen except by a rider on the trail.

Road decommissioning activities would be visible in the short term (immediate to 10 years) but would re-vegetate and not be apparent to the casual observer after that time.

Approximately 14 acres of new disturbance would result from trail construction. This disturbs less than 1% of the project area, and would have little or no effect on overall landscape character or scenic integrity.

The proposed trailheads would affect approximately 2 acres in the foreground of concern level 1 Forest Roads 700 and 867. Pipes or boulders would be used to delineate the boundary of the parking area, and colors that would help to blend trailhead signing into the setting would help reduce the contrast of the construction. In addition, if toilet facilities were provided, these would use colors that blend into the surrounding vegetation, and would be placed to help reduce contrast.

The proposed trail system will result in scenic impacts in a number of areas designated for moderate and low scenic integrity, but would also result in long-term scenic improvements in areas designated for moderate and high scenic integrity.

Cumulative Effects

Cumulative effects for this project are limited to the project area for 25 years. The cumulative effects of this project when combined with effects from fire and fuels reduction projects and

recreation projects (see Cumulative Effects project list in Appendix C) would result in some long-term and some short term effects. Short term denuded vegetation and soil exposure may occur along concern level 1 roads and trails as a result of fire constructed control lines and fuels reduction projects. These effects would combine with the proposed trail development in some areas to cause a cumulative increase in scenic impacts. In the long term (5-15 years), the cumulative action effects would become revegetated and would not be visible to the casual observer.

The Travel Management decision (2011) may result in localized areas of impact in dispersed camping corridors along Forest Roads 867, 714, 3E, 707, 762L, 9419U, 132, 235K, 235H, 700, 78, and 133. Cumulatively, new trail development resulting in removal of vegetation combined with the potential for vegetation removal in dispersed camping corridors may cause a decrease in scenic integrity in the immediate foreground along some roads in the project area. Beyond the immediate foreground (300 feet – ½ mile), and in the middle and background, there may be some increase in scenic integrity over the long-term as a cumulative result of road decommissioning and forest restoration efforts, which would improve scenic integrity by restoring understory vegetation. The long term cumulative effects resulting from recovery and re-vegetation of unauthorized routes from this project, skid trails and temporary roads from vegetation management projects, and temporary fire control lines may result in a trend toward higher scenic integrity.

Alternative C

Direct and Indirect Effects

Most of the proposed trails would be in areas of moderate scenic integrity objectives, or outside of the immediate foreground of high scenic integrity objectives as shown in Figure 11. Along the 129 miles of the designated road system, there are approximately 53 miles of trails proposed on concern level 1 roads, 21 miles concern level 2 roads, and 48 miles along concern level 3 roads. Segments of some of these trails would be visible in the immediate foreground but the dense tree cover in the project area obscures most disturbances of trails beyond the immediate foreground.

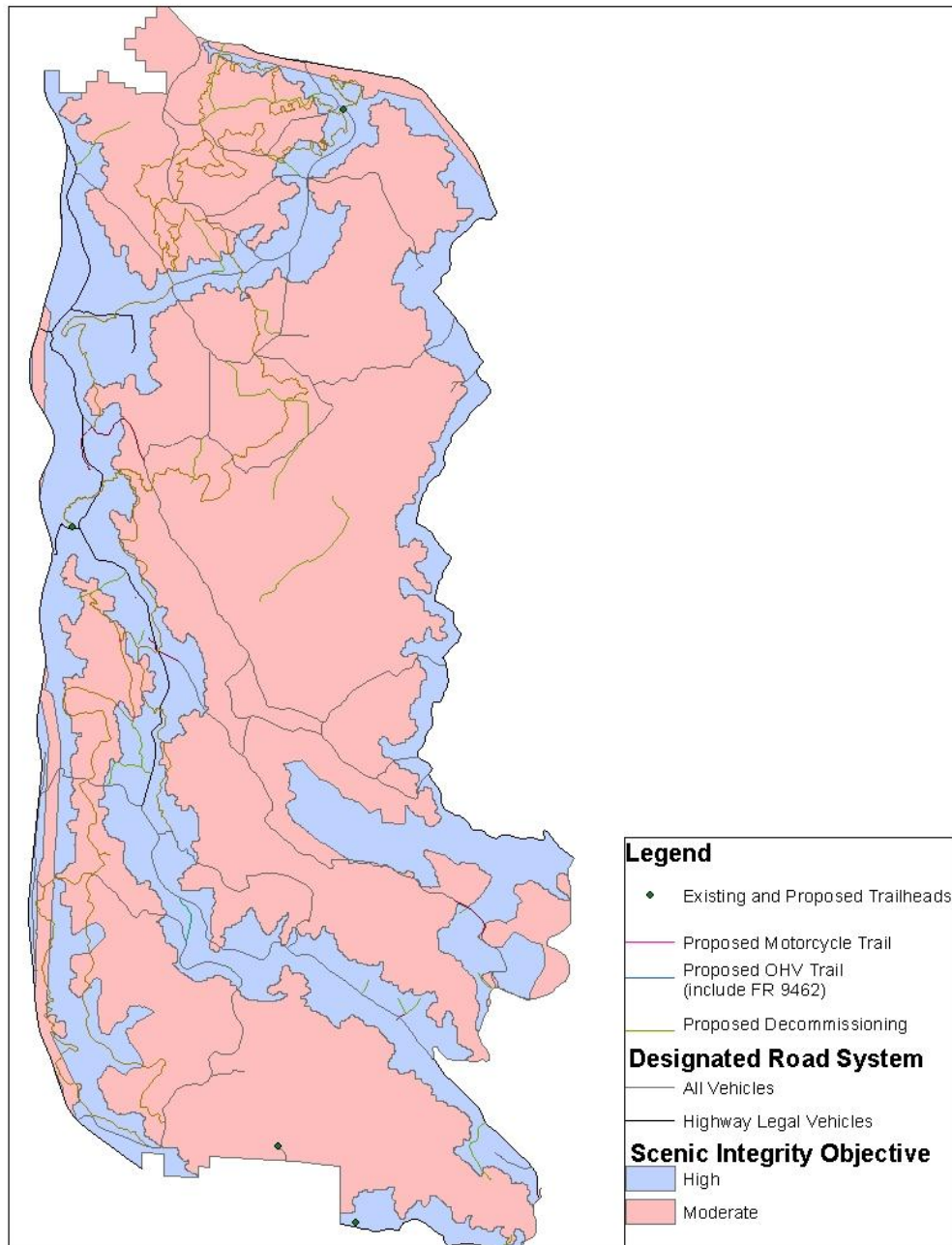
Table 7: Estimated miles of trails within moderate and high scenic integrity objectives

Action	Motorcycle Miles	OHV Miles	Total Miles	Moderate SIO	High SIO
Road to Trail Conversion	8.5	20	28.5	26.5	2
Adoption of Unauthorized Trail	7.5	--	7.5	--	7.5
Roads Open to All Vehicles	1.5	14	15.5	10.5	5
New Construction	35	10	45	30	15
Totals	52	44	96	67	29

Most of the proposed trails would be in areas of moderate scenic integrity objectives, or outside of the immediate foreground of high scenic integrity objectives as shown in Figure 19 and Table 7. Along the 129 miles of the designated road system, there are approximately 53 miles of trails proposed on concern level 1 roads, 21 miles concern level 2 roads, and 48 miles along concern level 3 roads. Segments of some of these trails would be visible in the immediate foreground but

the dense tree cover in the project area obscures most disturbances of trails beyond the immediate foreground.

About 30 percent of the Alternative C trails would be located in high SIO. This would be about seven percent more than Alternative B.

Figure 19: Proximity of Action Alternative C to designated roads and related scenic integrity

Effects of trail construction include destruction of understory vegetation and exposure of bare soil along 35 miles of motorcycle trails and ten miles of OHV trails. This would disturb approximately 19 acres. This represents less than 1% of the project area.

Road to trail conversion would occur on about 29 miles. The roadbed would be narrowed to accommodate either motorcycles (up to 36 inches) or OHV (up to 62 inches). The unused portion

of the road would be blocked off with natural materials. Over time the unused roadbed would naturalize and vegetate.

Approximately seven miles of user created motorcycle routes would be designated as system trails. There would be no effects from adopting the trails, but there may be short term effects from adding drainage structures and other work to bring the trails to Forest Service standards.

There are no effects from using designated roads as part of the proposed trail system.

Alternative C would decommission 14 miles of road. Scenic integrity would be improved in the long term as unauthorized routes revegetate and are not apparent to the casual user.

The proposed action trail system crosses the following concern level 1 roads: Forest Road 762, 700, 700H, 867, 867A, 236C and 235A. It crosses the following concern level 2 roads: Forest Road 78, 236A, 707, and portions of 235. In these locations, there would be evidence of vegetation removal, bare soil and route signing for up to ¼ mile depending on vegetation density and whether the trail is straight or curving (curving trails would disappear sooner). In addition, the proposed action trail system parallels approximately 0.1 miles total of Forest Roads 867 and 876A (concern level 1) and may be visible in the immediate foreground depending on vegetation density and whether the trail is straight or undulates closer or farther from the road. This also occurs along Forest Road 707 (concern level 2) for approximately 0.3 mile; Forest Road 235 for approximately 0.1 mile; and FR 236A for approximately 0.6 miles. The remainder of the trail system would be located outside of the immediate foreground and in middle and background visibility areas that would not be seen except by a rider on the trail.

Decommissioning activities would be visible in the short term (immediate to 10 years) but would re-vegetate and not be apparent to the casual observer after that time.

Approximately 19 acres of new disturbance would result from trail construction. This disturbs less than 1% of the project area, and would have slight greater effects on landscape character or scenic integrity than the proposed action.

The proposed trailheads would have the same effects as Alternative B, the proposed action.

The 1.5 miles of technical trail would have affects similar to trail construction.

The Action Alternative C trail system would meet the proposed scenic integrity objectives in the long term, but would have slightly more negative effects than Alternative B. The trailheads would be mitigated so that they would meet scenic integrity objectives in the long term.

Cumulative Effects

The cumulative effects for Alternative C are the same as those discussed for Alternative B. The differences between the alternatives are not great enough to cause a difference in the cumulative impacts.

Soil

This section describes the affected environment and environmental consequences for the Soil resource within the analysis area.

Methodology

A field reconnaissance was done November 18-20th, 2011, to understand soil and watershed function, investigate the current conditions of the trail system and identify potential limitations from soils. During the field visit, trails were hiked and a sample of new routes inspected according to landform features. Soil pits along with road cut surveys and drainage cuts were used to verify soil mapping. The field investigations were coupled with mapping information from Coconino National Forest geological mapping, Terrestrial Ecosystem Survey (USDA, 1995) for soil and ecological unit inventory information and interpretations, stream mapping, watershed condition assay and local knowledge from Coconino NF, Flagstaff District personnel, to interpret potential effects from the alternatives.

Geology mapping was used to establish underlying control on watershed function. Observations included soil development on contrasting geological units and stream drainage features. Risks from erosion were assessed using a combination of field observations of current and predicted impacts based on the runoff regime, vegetation and geomorphic surface.

EXISTING CONDITIONS

The Kelly Motorized Trails project area is one of broad ridges of either marine sedimentary or volcanic basalt alternating, in a northwest trending sequence with large swale bottomlands. The basalt generates steeper topography in the southern portion of the project area than the flat bedded sedimentary.

Vegetation is primarily ponderosa pine with grassland understory. Ponderosa pine (*Pinus ponderosa*) density increases on steep rocky slopes with gambel oak (*Quercus gambelii*) common in the basalt dominated areas and particularly rocky drainages. Alligator juniper (*Juniperus deppeana*) and Rocky Mountain juniper (*Juniperus scopulorum*) contribute minor tree cover throughout. Rich grassland understory is common dominated by Arizona fescue (*Festuca Arizonica*), prairie junegrass (*Koeleria macrantha*) and bluegrass (*Poa* spp.) The broad clayey parks increase substantially in Kentucky bluegrass (*Poa pratensis*).

Soils

Soil depth closely follows terrain, with flat lying surfaces leading to deep soils (>60 inches), both on the broad ridges, and within the drainage bottoms. Shallow soils (<20 inches) are on the valley slopes, particularly prominent in the Kaibab formation north of Mountainaire (Figure 20). Within the trail template, soils loss is mostly physical displacement from motorized travel. Wind and water erosion does contribute to soil loss or translocation along the trails. Fine soil particles in surface soils are loosened by wheeled travel, and transported by runoff sometimes off the trail. Wheels kick up fines as dust, removing them from the tread. Erosion potential increases with slope steepness, but also relates somewhat to infiltration capacity. Compacted surfaces collect runoff; road surfaces have higher potential compared to the smaller footprint of single track trails. Where runoff leaves the trail surfaces onto natural areas, the runoff typically disperses and abates within 20 feet. Natural surfaces will absorb runoff more efficiently once soils moisten after prior rainstorms.

Figure 20: Mapped Soils North of Mountainaire

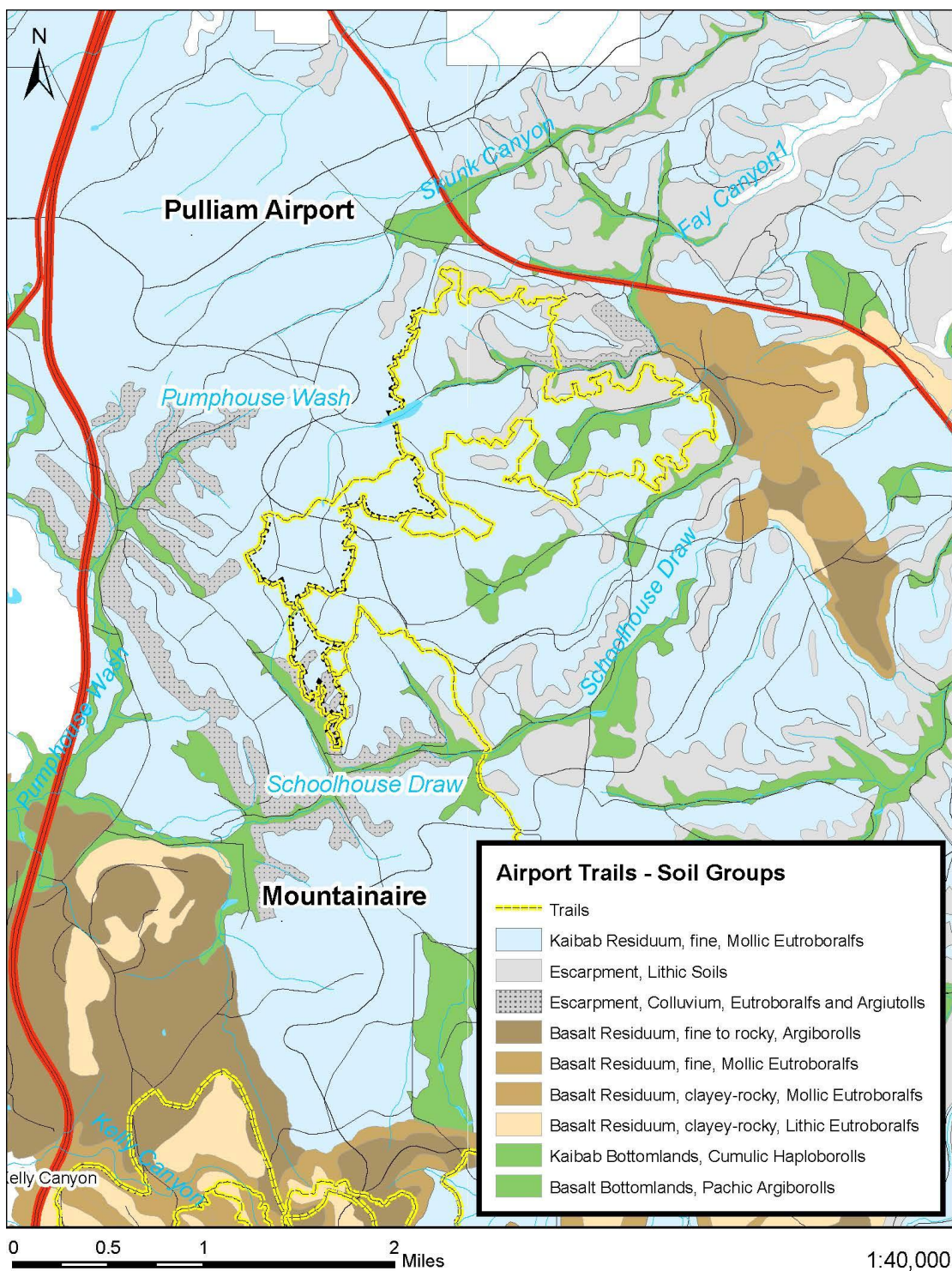
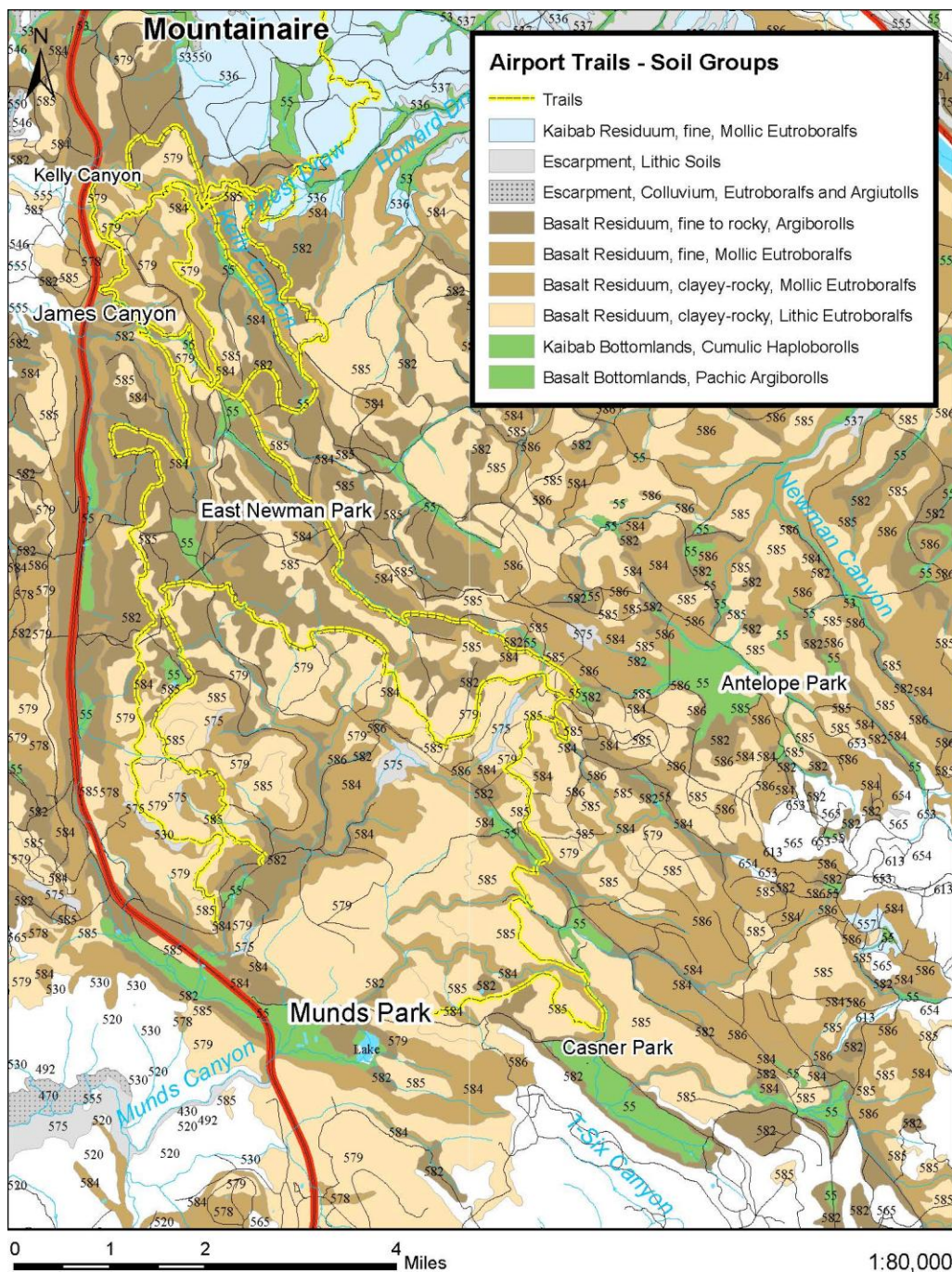


Figure 21: Mapped soils South of Mountainaire



* Map displays twice the scale as Figure 20. See Appendix B for TES map unit interpretations for soil condition, erosion hazard, and soil limitations related native surface roads and trails.

On the natural surfaces adjacent to trails, groundcover is the main control on erosion. The Kaibab formation soils with contiguous grassland cover provide an excellent buffer to erosion with grassland sod, and strong soil aggregation. The basalt soils have less organic matter for resisting erosion; though have abundant rocks that armor the surface. An additional factor that controls runoff is tree interception. A tree canopy disperses rainfall and lessens the chance for runoff.

Figure 22: Single Track with grassland cover on edges



Sensitive soils are interpreted as soils that are vulnerable to trail impacts. An example would be where soils are erosive and losses in topsoil would lead to proportional higher loss of productivity. Thin mantled soils, lithic soils, have higher potential for soil loss. Figure 21 shows the distribution of these lithic soils along the drainage escarpments, primarily within the Kaibab formation north of Mountainaire. The colluvial soils along these limestone drainage slopes have the highest risk since these allow for vegetation growth over the purely bedrock soils.

The park soils and drainage bottomland soils are also considered sensitive due to the rutting potential. These soils are loamy, lack rock for stability, and will rut deeply when wet. Compaction within these areas has higher consequences since these forms provide a high level of water storage. The deep alluvial fill and fine soil textures holds water effectively. Proposed trails avoid these bottomlands by routing along the toe slope and meadow edges.

Table 8 displays general soil, approximate location, characteristics, erosion hazard and other notes. Appendix 1 lists soil erosion hazard interpretations by TES map unit for the project area.

Table 8: Soils and parent material within the proposed trail system. All soils indicate cold, frigid temperature regimes and ustic moisture regime.

Soil Group	Location	*Characteristic	Erosion Hazard/Displacement	Notes
Kaibab residuum - Mollic Eutroboralfs	Limestone north	Topsoils with rich organic matter accumulation	Slight - Moderate/ Severe	Low shear strength
Kaibab bottomlands, Cumulic Haploboroll	Limestone north, Pumphouse Draw, Lower Schoolhouse, Priest Draw, Fay Draw	Organic rich topsoil > 16 inch depth; low rock content	Slight/ Moderate	Low soil strength
Basalt bottomlands, Pachic Argiborolls	Basalt south; East Newman Park, Frog Park	Organic rich topsoil > 16 inch depth, high clay content, lacks rocks	Slight / Severe	Low strength soils that lacks rocks
Escarpment with colluvium - Eutroboralfs and Argiutolls	Escarpments along drainages	Variable accumulation of organic matter; high base saturation, fine grained, cold frigid conditions with ustic moisture regime; expanding clay	Severe/ Moderate	Steep slopes
Escarpment - Lithic Argiborolls	Escarpments along drainages	shallow soil with rock restriction < 20 inch and rich organic accumulation	Severe / Severe	Thin soils on steep slopes that erodes easily
Basalt residuum, Lithic Eutroboralfs	Basalt south; Most common, Head of James Canyon, west of 700 rd	Shallow rocky soil < 20 inch, high clay content, high base saturation, low slopes	Slight/ Moderate	Rocky shallow soil that can erode easily on slopes
Basalt residuum, Mollic Eutroboralfs	Basalt south; less common	Organic rich topsoil < 7 inch, high clay content, high base saturation	Slight to Severe/ Severe	Rocky can have steep slopes- erodes easily
Basalt residuum, Argiborolls	Basalt south; uplands	Organic rich topsoil > 8 inch, high clay, rocky soils	Slight/Severe	Low soil strength

Trail conditions

The grassland type soils on the ridges and in the drainage bottoms are noted for low shear strength in the Terrestrial Ecosystem Survey (1995) (Table 8). Existing single track, unauthorized trails were surveyed. These surveys found that on the Kaibab formation led to incisions of 6 to 12 inches but otherwise were in good condition with little runoff generated except where the trail is located on steep slopes. Drainage control features, such as water bars, have mixed effects on these motorized single-track trails since they simply transfer water energy onto the natural slope and rill. The accumulated gravelly rubble and cupped nature of the trail appeared to contain and disperse runoff waters effectively within the trail template (Figure 23).

The shear stress exerted on native surface trails by trail users can loosen and displace soil materials that transport off site by wind and water. Motorcycle and ATV's have high powered torque that increases the detachment of the trail surface. The degree of soil erosion and deposition depends on the trail slope, amount of impervious area that collects runoff, and the armoring of the soil surface against runoff and trail user shear stress. Single track trails have less bare area to collect water than double track and old road surfaces, resulting in markedly less erosion potential. Trail incision occurs on single track trails where soil materials lack cohesive strength; sandy soils and soils without rock have poor soil strength. Seasonally, trail resistance to degradation varies by wetness. Wet saturated soils have less strength than moist, dry or frozen soils.

Figure 23: Wide track trails that accommodate ATV trail of Munds Park



Unauthorized trails and the forest road system in the northern project area had low incidence of offsite erosion on adjacent soils. Sediment deposits from off trail drainage did not appear to travel more than 20 feet off the trail template. The low erosion was from the user trails placed dominantly along the contour and the low topography of the plateau. Erosion deposits were primarily contained within the trail template. Steep pitches have rubble conditions where sediment moves down the trail surface and deposits on the lower gradient trail surface.

Single track trails in the northern project area degraded where trails crossed steep escarpments along drainage sideslopes. These areas had surface soil displacement and many routes navigating the terrain. However, disturbance was isolated to the rock faces. Offsite erosion and deposition of soil was small due to the lack of fine soil on these escarpments. The short expanses and contorted terrain also limited runoff concentration, preventing gully erosion.

For trails on hill slopes, particularly where parallel to slope, the silty/sandy matrix was prone to erosion by water or wind (or as dust kicked up by vehicles) leaving a gravel/cobble surface. Results were similar for the Kaibab and basaltic formations, though the basalt terrain is predisposed to a rocky surface. Deep rutting below 12 inches was observed within bottomland, and on the ridges that contained small depressions (1-10 acres) where clay soils were prone to saturation (Figure 25, Panel B). Ponding was observed on old road templates within poorly drained plateau soils on the Kaibab formation (Figure 25- Panel A). While rutting occurs within poorly drained natural grassland areas (Figure 25, Panel B). Compaction of soils, aggregation of rocks, and resistant bedrock layer in most cases controlled trail incision to no more than 6 to 12 inches.

The grassland parks, East Newman Park and Frog Park, showed surprisingly little impacts from motorized use despite easy access. Signing and fencing appeared to effectively control travel. Frog Park showed areas where use had stopped on old, gullied, closed trails and was staying on the designated trails to the side of the meadow. Tree roots stabilize the tread on low gradients on Frog Park vicinity trails.

The ATV trails in the basalts typically exhibit gravelly and rocky conditions except in larger order swales or parks. Though loamy soils do exist that would provide smooth trails with early use, the high rock content throughout the soil column would eventually erode to rock laden trails. The rock surface does armor resists rutting, though can lead to widening as trail users avoid large rock aggregates. We observed that trees helped confine the trail prism by holding traffic to the prism (Figure 23). Further, the roots provided stability that held the tread in place.

Figure 24: Single track on Kaibab formation chert member. Accumulated rubble slows and disperses runoff within the trail tread



Figure 25: Soil saturation conditions. Panel A taken along a road on the Kaibab formation. Panel B is off-road rutting observed near the Panel A road.



ENVIRONMENTAL CONSEQUENCES

Alternative 1 (No Action Alternative)

Direct and Indirect Effects

No new roads or trails would be constructed and no trail or road designations would be changed, thus there would be no effect to soils from route construction or designation changes in this alternative.

Under this alternative no roads would be decommissioned. Thus, soil erosion would continue to occur at a higher rate than would occur under the action alternatives which include decommissioning 14 miles of roads.

Cumulative Effects

The Kelly Trails area has ongoing livestock management throughout the system. No substantial adverse effects from ongoing grazing and fuels projects were found that would exacerbate soil degradation related to the current trail system.

Two fuels projects occurred within the project area within the last 10 years. The Mountaineer Fuels Reduction (2005) and Munds Park Fuels Project (2009) have forest thinning and prescribed burning activities. The fuels projects use Forest System roads and temporary roads to accomplish forest thinning and burning activities.

Prescribed burning from the fuels project removes forest groundcover that can increase erosion vulnerability. The project's low gradient topography and the mosaic burn pattern lower the potential for erosion and thus, the incidence for exacerbated erosion along trails.

Erosion from mechanical thinning and prescribed burning activities would likely result in a cumulative increase in soil erosion when combined with continued soil erosion from the 14 miles of roads that would not be decommissioned within the project area.

Alternative B (Proposed Action)

Direct Effects

The proposed action would improve the trail template drainage and thereby lessen soil damage from offsite erosion on the combined 29 miles of trail to be designated from existing roads or from unauthorized trails. The proposal incorporates unauthorized trails into the maintenance system that would allow for annual maintenance and response to degrading conditions and offsite soil disturbance. Poor trail conditions can arise where trails widen because of saturated conditions or side routes navigate bedrock.

Narrowing roads to trail corridors could reclaim 17.6 acres toward natural soil functional condition. Further, decommissioning 14 miles (25 acres) of old roads would improve the recovery of soil and vegetation on these 25 acres over the next ten years. The proposed road to trail conversions, narrowing the road templates, would reduce potential runoff and erosion by reclaiming the template outside of the trail corridor. This narrowing would trend the non-needed template to recover hydrologic function and the slower recovery process of soil biologic function

as organic matter increases over time. The narrowed template would reduce offsite erosion potential by a factor of 2/3's for single track and a third for OHV trails. Forest roads average 15 feet width and the conversion assumes restoration of at least 10 feet of the template for single track and 5 feet for OHV trails.

Road to trail conversions narrow 6 miles of road to motorcycle trail and 17 miles of road to OHV trail for 17.6 acres of total reclaimed soil surface. This reclamation improves drainage for the single-track route that climbs out of Schoolhouse Draw. The deep, mollic soils support a high level of grass and forb production and quick regrowth is expected. The single track conversion for a road circumventing Priest Draw effectively lowers potential erosion by reducing bare surface area within a concave draw. Roughly half mile reclamation occurs on the Kaibab where quick recovery is expected from low gradient topography and deep organic rich soils. Most of the reclamation occurs on the very rocky, basalt geology which has inherently lower erosion potential within the current road template. These roads have lost much of the fine sediment from the matrix and thus additional erosion is not expected. These areas favor regrowth of woody trees and shrubs given the rocky basalt soils.

Overall soil disturbance from new construction is calculated to be about 12.6 acres (Table 9). The new construction would likely result in an increase in soil erosion on these 12.6 acres. This erosion would be limited primarily to the surrounding area due to the surrounding ground cover and maintenance and trail design criteria designed to limit the movement of soil from the trail tread. An additional 1.4 acres of natural soil would be turned to parking areas for two trail heads (0.7 acres each).

Alternatives B proposes to decommission 14 miles of road affecting approximately 25 acres. This decommissioning would increase the recovery trajectory for these routes. The type of reclamation would need to vary according to the site potential. For instance, plateau soils that are rich in organic matter may only need ripping and seeding, while old roads on very rocky basalt hillslopes may only be reclaimed by blocking access and applying organic materials. Restoring hydrologic function would be the first priority, re-establishing natural surface drainage patterns. Soil infiltration would return much slower, taking greater than 10 years based on personal observations. In a study in northern Idaho, ripping in sandy loam granite terrain only restored 40% of infiltration initially (Luce 1997). Increased organic matter application through grass and forb growth, applied weed free mulch (chipped wood or on-site plant materials), and planting/transplanting woody vegetation would accelerate subsurface infiltration by bolstering the soil biologic function. Woody vegetation is favored for roads on the basalt soils that lack substantial topsoil for grass regrowth.

Table 9: Alternative B and C mileage and resulting additional losses or restoration of soils

	Alt B		Alt C	
Trail Design	Miles	Add/ Removed (Acres)	Miles	Add/ Removed (Acres)
Single Track	37		52	

	Alt B		Alt C	
Trail Design	Miles	Add/ Removed (Acres)	Miles	Add/ Removed (Acres)
• Road-to-Trail Conversion (10 ft reduction)	6	- 7.3	8.5	- 10.3
• New Construction	25	+ 6.1	35	+ 8.5
• Adoption of Unauthorized Trail	6	+ 1.5	7	+ 1.7
• Roads Open to All Vehicles	0	none	1.5	none
Less than 62" Trails	36		44	
• Road-to-Trail Conversion (5 ft reduction)	17	- 10.3	20	- 12.1
• Open Roads (level 2 and below)	11	none	14	none
• New Construction	8	+5.0	10	+ 6.3
Total	73		96	

Indirect Effects

The added trail network and trail head designation would improve traffic flow on the trail system by providing loop opportunities and dispersing motorized traffic. We speculate this dispersion could decrease use impacts on trails. Alternative B expands the motorized single-track mileage almost 3 fold on the Coconino National Forest while OHV mileage increases by 4 times the current designated amount of miles providing connections to roads.

Trail design measures would be the primary control for reducing damage to adjacent soils. Specific techniques to minimize offsite soil erosion and displacement by placing trails away from sensitive soil areas; these include bottomland swale drainages which compact readily and could gully due to lack of rock in the soil. Best management practice (BMP) # 4 specifies placing trails at least 66 feet from drainages on upland positions in addition to minimizing drainage crossing. Road and trail drainage crossings have higher erosion hazard since these draws funnel runoff while having higher erosivity from fine textured soils.

The project would ensure adequate drainage on the trail system by placing trails on the contour (BMP 2) and minimizing long steep pitches that concentrates runoff and induces gully within and off the trail (see Appendix A for trail design and construction criteria). Motorcycle trails would generally have a grade less than 12% except for short pitches of up to 25% along escarpments and short hillslopes. OHV trails would have short pitches up to 15%. On the proposed routes, these steep pitches occur on ridges, away from concentrated flow within side drainages.

In a case study of 78 miles of trail in the humid climate of Tennessee and Kentucky, Marion and Olive (2006) found erosion rates were not significantly higher till grades reached above 16%. Similarly, trails on the contour aligned had significantly less erosion than along valley bottoms.

Additional trail design to improve drainage includes using reverse grades that dissipates runoff and sediment within the trail template (BMP 2). Outsloping where possible on severe erosive sites lessens concentrated runoff from trails (BMP 2), although the berming from motorized travel can counteract the outsloping. The upper Priest Draw road to trail conversion is a specific location requiring this design.

Poor trail conditions from muddy conditions or excessive rock can lead to side routing that displaces and erodes natural soils outside of the managed trail corridor. Seasonal closure that depends on the degree of trail saturation would minimize side routes and rutting on poorly drained valley bottoms and the plateau. Rock laden trails are most common on the basalt soils, south of Mountainaire, where most of the OHV use is concentrated. Rocky conditions result from tires loosening fine soil particles on a wide erosional trail surface. Fine clays within these basalt soils leave the trail matrix, depositing on sides, draining onto adjacent soils, or transported as dust.

Maintaining a smooth trail footprint in the volcanic landscape is difficult since flat, park areas are sensitive to compaction, lacking rock for surface support and having an excess of 35% clay. Foothills, hillslopes and ridges are the most sustainable routes for motorized trail traffic. Despite the rocky conditions, these trails may be robust to motorized traffic. Trails observed on the escarpments in the northern project area typically showed little offsite erosion. Trails may widen out, but once the fine soil fraction erodes, the trail tread is unlikely to lead to further degradation. Confining traffic with natural barriers from rock and trees reduces trail widening. In the existing designated 9-mile Munds Park Trail network, regenerating trees confined trail traffic effectively along rocky hillslopes (see Figure 23 above). Retained tree roots within the trail template bind the supporting soil substrate. Leaving adjacent trees to trails intercepts rainfall and disperses rainfall that can produce runoff.

Overall, implementation of Alternative B would not pose a risk to soil productivity because of adequate design features and implementation of BMP's. Furthermore, the actions including new construction, road-to-trail conversion and road decommissioning would result in a net amount of 30 acres of previously compacted soils being reclaimed. This would result in an overall reduction of soil erosion in the project area and overall increase in soil productivity.

Cumulative Effects

Cumulative activities were considered over the next 10 years within the project area. Potential adverse effects of offsite erosion where livestock exacerbate offsite trail erosion were not found. Similarly, recently implemented fuels projects do not appear to show additional erosion where forestry activities overlap the proposed single track trails. The potential erosion hazard is low since the forestry activities, including thinning and burning, have not left large bare expanses that could contribute runoff. Also, the low gradient topography of the project area lowers the erosion potential within the fuels project area.

While the overall project is likely to result in a net reduction of soil erosion due to a net reduction in compacted surfaces with bare soil, cumulative impacts may occur where activities such as

concentrated grazing impacts, thinning with mechanized equipment, or establishment of control lines or piles associated with prescribed burning occur in areas that connect to areas with new construction. In these areas where there is a combined impact, soil erosion is likely to result in a cumulative increase. However, these areas are very small in size and thus the soil erosion is expected to be limited in scope and extent and would be absorbed by the surrounding vegetation.

Alternative C

Direct and Indirect Effects

Alternative C adds 10 miles of single track construction and 2 miles of OHV trail construction. However, as a result of road-to-trail conversion and road decommissioning included in this alternative there would be a net 3.9 acres of soil that would be revegetated and reclaimed from compacted, bare-ground soils. In addition, due to the additional trail mileage it is expected there would be traffic management, common to both action alternatives. This alternative would improve the overall soil condition on existing designated routes over the no action alternative. The addition of technical trail section would not impair natural soils since technical riding would mostly take place on an old rock quarry site.

Overall, implementation of Alternative C would result in additional designation of motorized routes where there would be soil erosion, yet this soil erosion would be limited to the designated routes and would not pose a risk to soil productivity to surrounding areas because of adequate design features and implementation of BMP's.

Cumulative Effects

The effects would be similar to the proposed action with low potential for adverse soil effects from recent forestry projects and livestock grazing.

Hydrology

This section describes the affected environment and environmental consequences for the Hydrology resource within the project area. Issues raised during scoping related to water quality were pollution by mercury, primarily of Lower Lake Mary which has levels exceeding state water quality standards (ADEQ, 2010a) and is a drinking water source for the City of Flagstaff. The immediate source is considered to be sediment from watershed runoff; the concern is that this might be exacerbated by an enhanced trails system that would induce increased runoff and sediment delivery.

Methodology

Field work was performed November 18-20th, 2011. Existing Trails were hiked and a sample of new routes inspected according to landform features. All blue lines illustrated on 7.5 minute USGS topographic maps were used to establish flow regime. Geologic mapping (Bills et al, 2005) was used to help establish control on flow regime (i.e. perennial or seasonal). Observations included soil development on contrasting geological units and stream drainage features. Risks from erosion were assessed using a combination of field observations of current impacts and predicted impacts based on the flow regime, vegetation and geomorphic surface.

EXISTING CONDITIONS

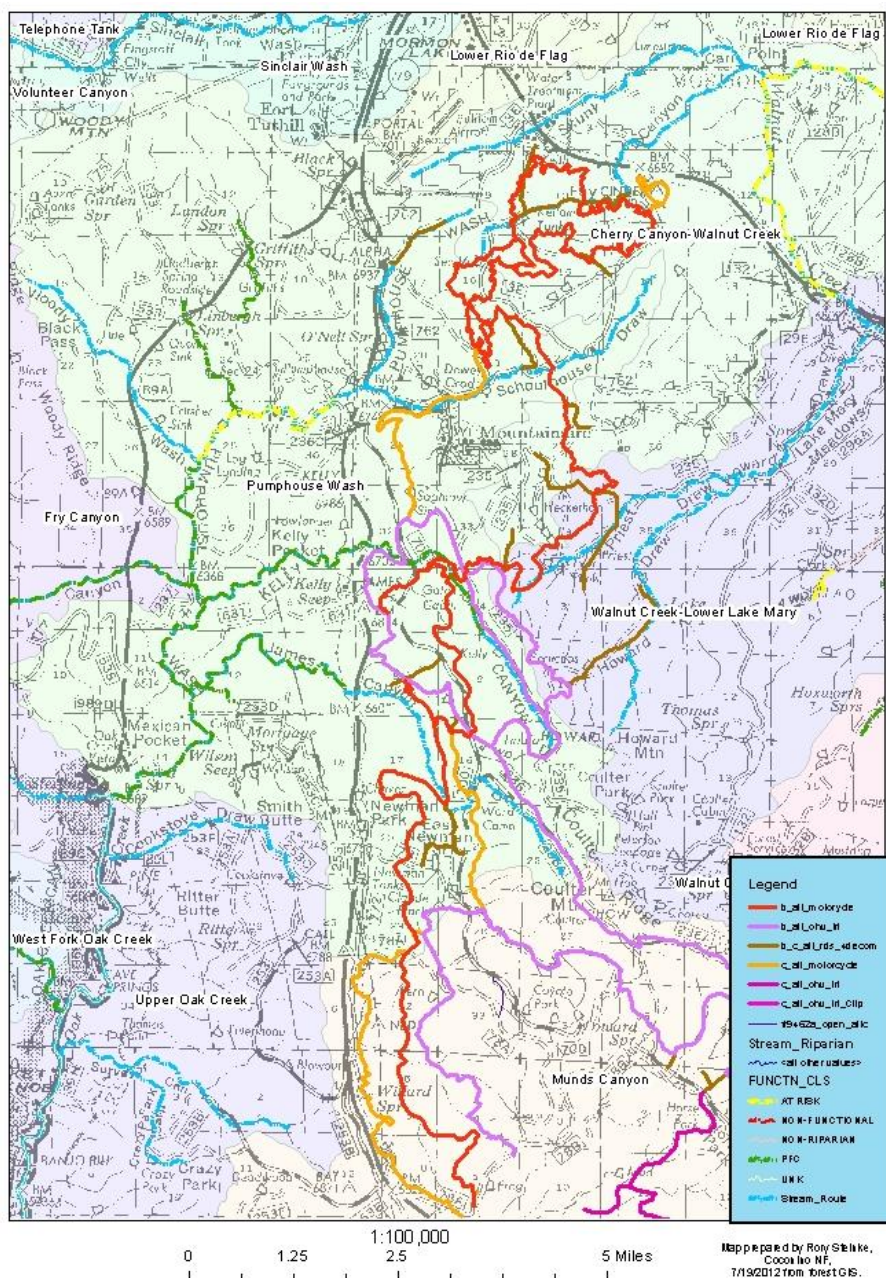
Riparian Area

The only riparian area located within the project area adjacent to or within proposed roads and trails is an approximate 2.2 mile reach in Kelly Canyon located in the Pumphouse Wash 6th HUC watershed (see Figure 26). Kelly canyon flows into Oak Creek approximately 10 miles downstream. The forest has assessed the riparian area in Kelly Canyon and determined it is in Proper Functioning Condition (USDI, 1998) indicating the existing road (Forest Road 235) has not directly negatively affected riparian function in the riparian area.

Watersheds

The affected 6th HUC watersheds are displayed in the map below (Figure 26) and include Cherry canyon-Walnut Creek, Pumphouse Wash, Walnut-Creek-Lower Lake Mary, Munds Canyon and a few acres of Walnut Creek-Upper Lake Mary. Only trail and road segments located in Walnut Creek-Lower Lake Mary flow into Lake Mary where ADEQ has identified the water as impaired due to high levels of mercury found in fish tissue.

Figure 26: Kelly Motorized Trails 6th HUC & Riparian Areas



Hydrology

Four seeps/springs exist in the project area, with one in a private inholding. There are no perennial streams in the project area. All stream courses are either intermittent or ephemeral, with water flow that occurs seasonally for several weeks following snow melt off in the spring or for short duration following storm events during the summer monsoon season.

Water quality

Numerous studies worldwide have shown that concentrations of mercury, largely as methyl-mercury (CH_3Hg^+) in lake sediments have increased since the beginning of the industrial age (about 200 years before present), and that the major source is atmospheric deposition in lake watersheds (Biester et al, 2007). The specific source of contamination in any given area, because of wide dispersion by winds is often impossible to discern. Increasingly high concentrations of mercury, through time, are evidenced in the Greenland ice cap and sediments in Minnesota lakes (Swain et al, 1992; Schuster et al, 2002). Toxic levels of soluble mercury compounds are found in otherwise pristine lakes in Wisconsin wilderness (Rada et al, 1989).

Mercury injected into the atmosphere is largely in elemental form (Hg^0), but once deposited on the surface, and entering water bodies through erosion and runoff process will readily create soluble methyl- and more volatile diethyl-mercury ($(\text{CH}_3)_2\text{Hg}$) facilitated by bacteria in aerobic or anaerobic conditions. Mercury from these compounds becomes concentrated in fatty tissue of fish by as much as three orders of magnitude (1000 times) over background rates in the water.

Analysis of fish tissue (mostly walleye) and lake sediments in Lower and Upper Lake Mary, and others nearby, found high concentrations of mercury (ADEQ, 2010a). On one occasion concentrations in fish tissue exceeded state standards for human consumption. Atmospheric deposition is the suspected primary source. Analysis of soil in the watershed at 10 to 12 inches depth showed mercury concentrations of between 10 and 43 parts per billion, which agree well with concentrations found lower in lake bed sediment cores aged to approximately the beginning of the industrial age, which may be considered a natural background rate. No other locally based activity, including erosion from upland roads, would account for steadily rising concentrations of mercury in runoff sediments settling to the lake bottoms.

Oak Creek is listed impaired for *E. coli* contamination (ADEQ, 2010b). Sources are considered to be leaky septic systems and recreational swimming at location such as Slide Rock State Park. The affected reaches begin about 10 miles downstream of project proposed trails.

Trail conditions

Single track, unauthorized trails on the Kaibab formation led to incisions of 6 to 12 inches (Figure 27 and 29) but otherwise did not impair hydrological flow with little runoff generated excepting where the trail paralleled steep slopes.

Figure 27: Unauthorized trail on Kaibab Limestone



For trails on hill slopes, particularly where parallel to slope, the silty/sandy matrix was prone to erosion by water or wind (or as dust kicked up by vehicles) leaving a gravel/cobble surface. Results were similar for the Kaibab and basaltic formations, though the basalt terrain is predisposed to a rocky surface (Figure 28). Deep rutting below 12 inches was observed within bottomland, and on the ridges that contained small depressions (1-10 acres) where clay soils were prone to saturation.

Figure 28: Unauthorized trail on basalt



Figure 29: Unauthorized trail descending hill on Kaibab Limestone

The OHV trails in the basalts typically had very gravelly and rocky conditions (Figure 29) except in larger order swales or parks. Though loamy soils do exist that would provide smooth trails with early use, the high rock content throughout the soil column inevitably leads to rocky trails. The basalt rock armors the trail surface resistin, as a result these trails have little or no effect on hydrology of the area. However, trail drift to work around large rock aggregates widens the footprint. Without maintenance, trail drift is expected to increase over time, resulting in eventual channelization and increasing amounts of sedimentation to downstream sources.

ENVIRONMENTAL CONSEQUENCES

Alternative 1 (No Action Alternative)

Under the no action alternative, current management plans would continue to guide the management of the project area. No trails would be constructed, no roads or existing unauthorized trails would be obliterated, and no roads would be converted to trails. Roads proposed under Alternatives B and C for decommissioning would not occur. These roads would continue to deliver sediment downstream from motorized vehicular use.

Direct and Indirect Effects

There would be no direct effects from the No Action alternative. There would be no effect to riparian habitat. This Alternative would not result in any increase in sedimentation that potentially carries mercury to Lake Mary which is listed as impaired. There would be no substantive change in sedimentation rate or hydrology response in the stream system. Fourteen miles of decommissioned roads would not occur within the Walnut Creek - Lower Lake Mary, Munds Canyon, Pumphouse Wash, and Cherry Canyon - Walnut Creek watersheds.

Cumulative Effects

The Kelly Trails area has ongoing livestock management throughout the system. No substantial adverse effects from ongoing grazing and fuels projects were found that would cumulatively affect the hydrology in the project area.

Alternative B (Proposed Action)

Direct and Indirect Effects

Trail construction would increase bare and compacted ground. In some cases the immediate tree canopy will be reduced to accommodate the trail.

Indirectly, compacted trails would pond precipitation water, especially during snowmelt and monsoon rainfall and in some reaches lead to overland flow. Surface erosion could occur either as rills or sheet flow, where trail runoff is directed onto hill slope. Where trails descend steep hills, rutting could occur.

The following TMDL's are affected by the project area watersheds: Oak Creek (about ten miles downstream of project trails) for *E. coli* and Lake Mary for mercury in fish tissue. These TMDL's are designed to improve water quality through recommended appropriate management activities by the Coconino National Forest and state agencies (USFS, 2011).

Oak Creek TMDL does not include recommendations for motorized use or road decommissioning. The Lake Mary TMDL also does not include recommendations to limit off-road motorized use or motorized vehicular use on roads; however, it does state that watershed loading of mercury can be reduced through management of sedimentation and vegetative stability (USFS, 2011). Methods to reduce sediment and improve vegetative stability are relegated to practices the Forest Service has used in the past that have proven to be effective including integration of site specific BMP's. Implementation of the current TMR and decommissioning roads has been analyzed and is expected to be effective at reducing soil disturbance and sedimentation.

A mineral fine (< 0.004mm) as well as organic detritus can be carried as suspension as far as continuous surface flow is maintained, including sheet flow (Bilby et al, 1988; Forsyth et al, 2006). During spring snow melt or intense rainfall, shallow sheet flow that carries suspended particles may pervade where incised channels are not evident.

Elemental mercury from aerial deposition also adheres to clay particles. While mercury deposition directly on the surface of water certainly occurs, the principle source is mercury adhered to soil and organics and carried into lakes via streams draining the forest. The quantity of mercury that may be expected can be calculated using the model developed by the Arizona Department of Environmental Quality (ADEQ, 2010a).

Only OHV and motorcycle trail and road segments (minor in extent) located in Walnut Creek-Lower Lake Mary flow into Lake Mary where ADEQ has identified the water as impaired due to high levels of mercury found in fish tissue. Sediment contributions associated with these trails are not expected to contribute appreciable amounts of sediment into Priest or Howard Draw since they are minor in extent and low in disturbance magnitude. Two road segments are proposed for decommissioning in the Walnut Creek – Lower Lake Mary watershed which drains into Lower

Lake Mary (Figure 31). The proposal to decommission these roads should reduce the soil disturbance from motorized travel and improve downstream water quality to Lake Mary including reduce sediment that may be delivering mercury to Lake Mary.

A proposed OHV trail crosses the riparian area in one location but does not pose a risk to riparian function since it is of minor extent and implementation of identified BMP's especially #4 listed in the Design Feature section

Overall, implementation of identified BMPs is expected to mitigate sediment delivery into Lower and Upper Lake Mary.

Riparian Area Effects

Forest road 235 runs adjacent to portions of Kelly Canyon riparian area, but is located on higher lying terraces and outside of the riparian area and streamside management zone allowing sufficient vegetation to filter any sediment that may be delivered off of FR 235. Therefore, motorized travel does not directly impact the riparian area itself and does not contribute large amounts of sediment into Kelly Canyon.

A proposed OHV trail crosses the riparian area in one location but does not pose a risk to riparian function since it is of minor extent. Also implementation of identified BMP's would mitigate impacts.

Implementation of Alternative B would not pose a risk to riparian area function and downstream water quality including impaired waters in Upper and Lower Lake Mary and Oak Creek because of adequate design features and implementation of BMP's.

Spring

Willard Springs is approximately 200 feet from the proposed trail route, which would not have an effect on spring function or the area being influenced by spring discharge. The other three springs in the project area are located beyond the influence of the proposed trail routes.

Mercury

Average total mercury concentration, including methyl form, in the water of Upper and Lower Lake Mary is well below threshold levels for domestic water use. Nonetheless, mercury in the methyl form is concentrated in some fish species (e.g. walleye) in the lakes at levels 1000 times that of the water column and 2 to 3 times over safe levels for human consumption.

Bringing together results of soil and lake sediment sampling, research of mercury use in the local area, and studies of mercury concentration in rock type similar to Lake Mary watershed show that up to 95 percent of the mercury in Lower and upper Lake Mary is from direct aerial deposition (ADEQ, 2010a). The ultimate source of the aerial mercury is at least regional and mostly global in scope, and the majority portion from burning of fossil fuels, including coal. The air-borne mercury is largely in the elemental form (Hg^{2+}). While some small amount deposits directly onto lake surfaces, the rest settles onto the land and vegetation where it will readily bond with mineral soil and organic detritus particles, but particularly to clay, that may be washed into the lake. In the lake water column mercury attached to suspended particles enters into either a methylation or redox process (Whalin et al, 2007; ADEQ, 2010a). As methyl mercury it is readily absorbed into the tissues of fish, accumulating in amount up the food chain.

The particular reasons for the chemical reactions in the lakes may have to do with the high fluctuation of lake level over a year. For instance, between runoff seasons, Lower Lake Mary loses water rapidly through a sinkhole (up to 45% of all losses). During spring snowmelt and to a lesser extent monsoon rain, water level rises rapidly inundating previously dried ground. Not only is most of the mercury load brought in during the two strong runoff seasons but re-wetting of lake bottom increases sulfate and organic carbon which are important in methyl mercury production. Within the rising water column, sulfur reducing bacteria facilitate the transformation to methylated form (Gilmour et al, 2004).

Regardless of the initial source of mercury, watershed loading can potentially be reduced through management of sedimentation and vegetative stability. The ADEQ formally adopted a threshold of 0.3 mg/kg concentration of mercury in fish tissue in January 2009 (ADEQ, 2010a). Using a model that correlated fish length and tissue concentration of mercury to water column concentration of mercury, predictions could be made of tissue concentrations based on concentration in water, and thereby determined a Total Maximum Daily Load (TMDL) of mercury into the lakes. For Lower Lake Mary the TMDL is 0.8 grams per day mercury input into the lakes. At this level concentration in fish tissues is predicted to stay under the 0.3 mg/kg threshold. At the present time Lower Lake Mary is not meeting this target, and a reduction of 32 percent of present load is required.

Using the Universal Soil Loss Equation (USLE) method, the ADEQ calculated total annual sediment input into Lower Lake Mary of 921,000 kg. Any activity that increases sediment input into the lake increases total mercury concentration as well.

To assess the potential sediment resulting from the action alternatives the Water Erosion Prediction Program (WEPP) was used. Input parameters for WEPP used are similar to that outlined in the Coconino watershed report for Forest Travel Management Analysis. Traffic volume was assumed high as a model input. There are no proposed trails in Upper Mary Lake watershed, only in Lower Lake Mary Watershed. Analysis showed that applying the buffer on channels of 2 chains (132 feet) was sufficient in reducing sediment delivered to channels by at least 93 percent for use (see Table 10). All proposed trails within 500 feet of a draw were in the Fay Canyon or Priest Draw tributaries to the lake.

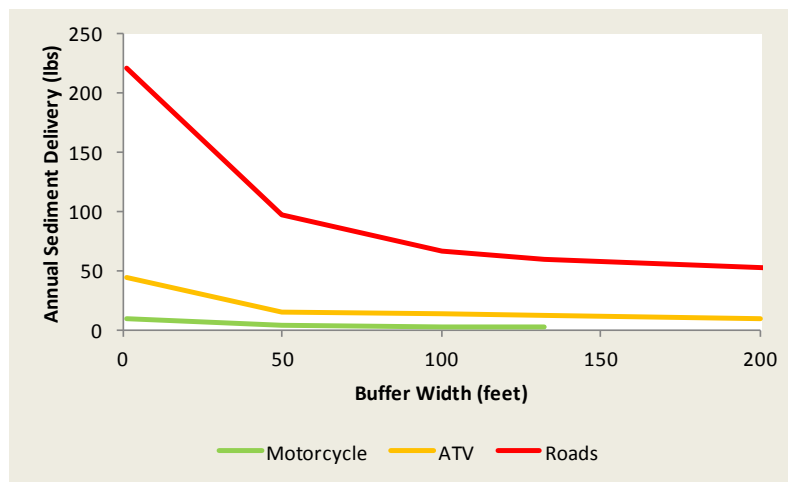
Table 10: Results of WEPP runs for Proposed Action Alternative B; Lower Lake Mary Watershed

Type	Length in stream buffer (feet)	*Sediment delivered (+) or (-) (lbs)	Increase (+) or decrease (-) in annual sediment budget and Hg loading (%)
Motorcycle	2311	+35	+0.0017
Decommission Road	3718	-1078	-0.0530
Net loading			-0.0513

*--sediment delivered on annual basis

There is an assumed linear relationship between mercury loading in lake water and sediment delivered to the lakes. A positive non-linear relationship exists, however, between fish tissue concentration and concentrations in the lake water. The increase of mercury associated with the increase sediment in water represented by alternative B action is on the order of 0.3 parts per billion, which is close to minimum detection level used by the ADEQ (ADEQ, 2010a). Fourteen miles of decommissioned roads are planned for the project area, including 3,718 feet within stream buffer in Howard and Priest Draws in the Lower Lake Mary watershed (Figure 31). These decommissioned reaches represent a net decrease in total annual sediment load of about 0.05 percent.

Figure 30: Sediment delivery from different trail use



The decommissioned segments are mostly in Kaibab Formation which would be expected to affect a moderate recovery in basal vegetation, because of moderate soil depth and water holding capacity. Annual sediment load from roads is mostly due to traffic use. Once the segments are decommissioned sediment load should decrease markedly by the first year and fully by the end of the first decade.

Sediment delivery from different trail use is displayed in Figure 30. Similar WEPP analysis was conducted for the Pumphouse Wash watershed that drains into Oak Creek and includes Kelly and James Creek. Alternative B trail use designation is motorcycle, and OHV (tread width of 62 inches). Table 11 shows results comparing Alternative B trails to current Forest Service road network and decommissioned roads. Decommissioned Forest roads in Pumphouse Draw, Schoolhouse Draw, and James Creek amount to 5,868 feet (Table 11). The reduction in sediment from these decommissioned segments is almost tenfold the amount added from proposed motorcycle and OHV routes.

Table 11: Results of WEPP runs for Proposed Action Alternative B for Pumphouse Wash Watershed

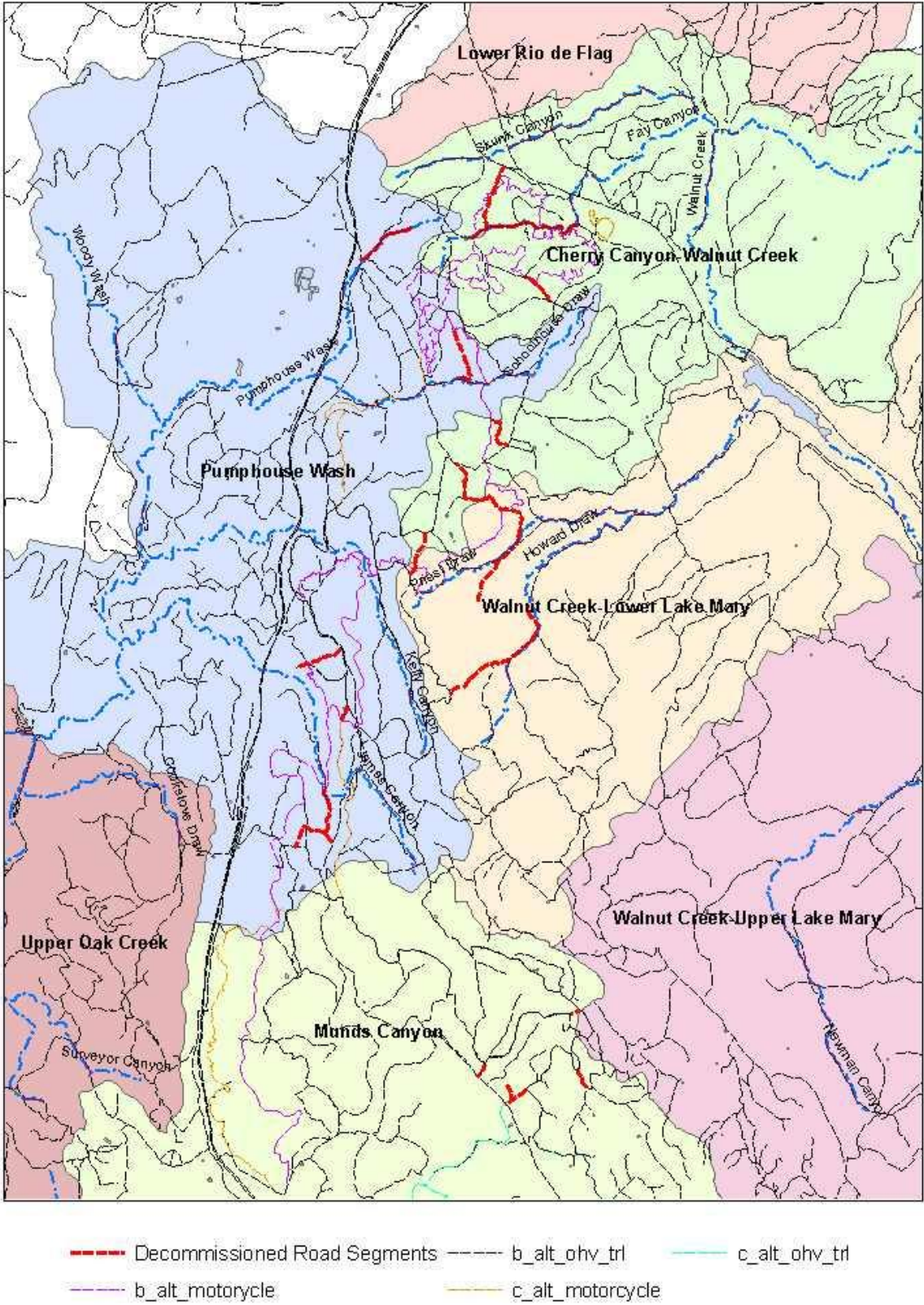
Type	Length in stream buffer (feet)	*Sediment delivered (+) or (-) (lbs)	Increase (+) or decrease (-) in annual sediment budget from roads and trails (%)
Motorcycle	1,241	+19	+0.10
ATV	2,322	+139	+0.74
Decommissioned Roads	5,868	-1,701	-9.07
Net Loading			-8.3

*--sediment delivered on annual basis

Using WEPP analysis on roads and trails in a buffer of 2 chains, the proposed action would decrease sediment load by about 8 percent of the contribution from the Forest Service road system. This value is close to typical measurement error for flow and suspended sediment in mountainous stream channels and may be undetectable. The decreased sediment would not increase pathogen levels for which Oak Creek is listed as impaired.

Figure 31: Project watersheds and proposed decommissioned roads

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Cumulative Effects

Past, present and reasonably foreseeable actions that are relevant to water resources are described below for all alternatives. The cumulative effects analysis boundary includes the Walnut Creek - Lower Lake Mary, Munds Canyon, Pumphouse Wash, and Cherry Canyon - Walnut Creek watersheds since any disturbances analyzed could cause a potential impact on these watersheds.

Reasonable foreseeable actions that can affect water resources include adjacent national forest travel management decisions, livestock grazing allotments, fuels reduction projects and forest thinning projects. These projects may result in short term soil disturbance including removal of the protective vegetative ground cover that may result in short term increases in soil erosion. However through implementation of best management practices to mitigate on-site water quality concerns, risks should be minimized and not pose a threat to water resources. Thinning the forest would reduce fuel loads and the associated risk of high burn severity wildfire that might otherwise result in complete removal of protective vegetative ground cover, increased erosion, loss of soil productivity, sedimentation and reduced water quality. The recent Travel Management Rule decision has closed numerous miles of roads to the public in the project area watersheds which is beneficial to the hydrology resource. The proposed action would restrict motorized use to designated trails, cumulatively decrease erosion, and improve the hydrology in the project area in the future.

Alternative C

Direct and Indirect Effects

The direct and indirect effects are the same as described above in this section under Alternative B—Proposed Action, with the exception under indirect effects that there is an additional 2,771 feet of motorcycle trail within 2 chains of a stream channel, Schoolhouse Draw, which would not contribute to a measureable increase in sediment generated from trails. There would be no effects to riparian habitat as the additional trail mileage is outside of the riparian area. Elsewhere, the additions to the OHV system under this alternative are well separated from stream courses and their buffers. The proposed trials route is not likely to result in increased sediment transport, since the location proposed is in an old quarry site. The special use events could result in additional sediment transport from the increased traffic use, but this could be minimized with routine maintenance.

Overall, and similar to Alternative B, implementation of Alternative C would not pose a risk to riparian area function and downstream water quality including impaired waters in Upper and Lower Lake Mary and Oak Creek because of adequate design features and implementation of soil and watershed BMP's. Alternative C would decrease overall sediment delivery to Pumphouse Wash and Lower Lake Mary watersheds (see Table 12).

Table 12: Results of WEPP runs for Action Alternative C; Pumphouse Wash watershed

Trail use	Trail length in buffer (feet)	*Sediment delivered (+) or (-) (lbs)	Increase (+) or decrease (-) in annual sediment budget from roads and trails (%)

Trail use	Trail length in buffer (feet)	*Sediment delivered (+) or (-) (lbs)	Increase (+) or decrease (-) in annual sediment budget from roads and trails (%)
Motorcycle	4012	+60	+0.32
ATV	2322	+139	+0.74
Decommissioned Roads	5,868	-1,701	-9.07
Net Load			-8.01

*--sediment delivered on annual basis

Cumulative Effects

Cumulative effects are the same as the proposed action.

Wildlife

This section describes the affected environment and environmental consequences for the Wildlife resource within the analysis area. It also describes the anticipated effects of both action alternatives on noise generated by motorized users and impacts to wildlife, an issue identified during the public scoping process (see *Issues* section).

Methodology

Wherever possible, species specific habitat and locality data were used from the wildlife geo-database and District GIS information. Site visits were made to multiple portions of the project area on April 5th, and May 10-11th, 2012. Scientific literature was consulted, as well as previous Biological Assessments with similar actions located on the Coconino National Forest.

The action area refers to the area within ¼ mi of proposed trails and other project-related activities. This buffer was selected because impacts of the proposed activities could occur up to ¼ mi from project activities. The project area is the immediate area where trail construction, conversion, or inclusion would occur. The cumulative effects boundary is the analysis area which generally follows the ¼ mi buffer of proposed trails.

Threatened, Endangered and Forest Service Sensitive (TES) Wildlife Species

There is one federally listed species under the Endangered Species Act and 12 Region 3 Forest Service Sensitive Species that are present or have habitat within the project area (Table 13).

Table 13: Threatened, Endangered and Forest Sensitive (TES) Wildlife Species

Species Name	Status Federal/ State/ FS	No Suitable Habitat	Suitable Habitat Present	Suitable Habitat Occupied
Mammals				

Species Name	Status Federal/ State/ FS	No Suitable Habitat	Suitable Habitat Present	Suitable Habitat Occupied
Black Footed Ferret, <i>Mustela nigripes</i>	E / --- / SEN	X		
Navajo Mogollon vole, <i>Microtus mogollon Navaho</i>	--- / S1 / SEN		X	
Long-tailed vole, <i>Microtus longicaudus</i>	--- / S4 / SEN		X	
Wupatki Arizona pocket mouse, <i>Perognathus amplus cineris</i>	--- / S2 / SEN	X		
Merriam's shrew, <i>Sorex merriami leucongenys</i>	--- / S3 / SEN		X	
Dwarf shrew, <i>Sorex nanus</i>	--- / S1 / SEN	X		
Spotted Bat, <i>Euderma maculatum</i>	--- / S2 / SEN		X	
Allen's lappet-browed Bat, <i>Idionycteris phyllotis</i>	--- / S2 / SEN		X	
Pale Townsend's big- eared Bat, <i>Corynorhinus townsendii pallescens</i>	--- / S3 / SEN		X	
Greater western mastiff Bat, <i>Eumops perotis californicus</i>	--- / S1 / SEN	X		
Birds				
American peregrine falcon, <i>Falco</i>	--- / S4 / SEN		X	

Species Name	Status Federal/ State/ FS	No Suitable Habitat	Suitable Habitat Present	Suitable Habitat Occupied
<i>peregrines anatum</i>				
Bald Eagle, <i>Haliaeetus leucocephalus</i>	--- / S2 / SEN		X	
Mexican spotted owl, <i>Strix occidentalis lucida</i>	T / --- / SEN			X
Northern goshawk, <i>Accipiter gentilis</i>	--- / S3 / SEN			X
Clarks grebe, <i>Aechmophorus clarkia</i>	--- / S2 / SEN	X		
Ferruginous hawk, <i>Buteo regalis</i>	--- / S2 / SEN	X		
Western burrowing owl, <i>Athene cunicularia hypugaea</i>	--- / S3 / SEN	X		
Reptiles and Amphibians				
Narrow-headed gartersnake, <i>Thamnophis rufipunctatus</i>	--- / S3 / SEN	X		
Northern leopard frog, <i>Rana pipiens</i>	--- / S2 / SEN	X		
Insects				
Spotted skipperling, <i>Piruna polingii</i>	--- / SNR / SEN		X	
Mountain silverspot butterfly, <i>Speyeria nokomis nitocris</i>	--- / SNR / SEN		X	
Blue-black silverspot butterfly, <i>Speyeria</i>	--- / SNR / SEN		X	

Species Name	Status Federal/ State/ FS	No Suitable Habitat	Suitable Habitat Present	Suitable Habitat Occupied
<i>nokomis nokomis</i>				
Table legend Federal Status: E – Endangered, T – Threatened, P – Proposed, C – Candidate State Status: S1 – Critically Imperiled, S2 – Imperiled, S3 – Vulnerable to extirpation or extinction, S4 – Demonstrably widespread, abundant, and secure, SH – Possibly Extirpated, SNR – HS – Forest Service (FS) Status: SEN – Sensitive (Revised using 10/01/07 Transmittal Letter and 9/21/07, Master FS Sensitive Species List)				

Threatened and Endangered Species

Mexican Spotted Owl

The Mexican spotted owl (*Strix occidentalis lucida*, MSO) occupies mixed conifer and ponderosa pine/Gambel oak vegetation types on the Coconino National Forest. These areas are usually characterized by high canopy closure, high stem density, multi-layered canopies within the stand, numerous snags, and downed woody material. The majority of the suitable nesting/roosting MSO habitat is characterized by steep slopes and canyons with rocky cliffs, or within old growth pine/oak habitats.

Mexican spotted owls are nocturnal predators that utilize “perch and pounce” tactics, locating prey from an elevated perch by sight or sound and then pouncing on the prey and capturing it with their talons. They consume a large variety of prey throughout their range, but feed primarily on small and medium sized mammals such as microtine voles, peromyscid mice, and woodrats. They also eat bats, birds, reptiles, and arthropods.

EXISTING CONDITIONS

Five Protected Activity Centers (PACs) exist within the project area and a ¼ mi buffer. These are the Lake #1 Seruchos PAC (#40526), Howard Mountain PAC (#40513), Coulter Ridge PAC (#40515), Bonita Tank PAC (#40514), and Coyote Park PAC (#40525).

Lake #1 Seruchos PAC – This PAC was surveyed in 2012, during which nesting MSOs were located. The nest tree was identified through daytime follow up visits. This nest area is not within the historic nest core, and exists approximately 1 mi from the currently proposed trail section. All portions of the proposed trail are > 0.25 mi from the PAC boundary.

Howard Mountain PAC – This PAC was last monitored in 2002, with no MSO detected. A single male was last detected in this PAC in 1993. The trail runs along the western PAC boundary. A nest core ‘area’ has been established in this PAC, choosing the best habitat available. No actual nest or roost has been found in this PAC to this date. All historic locations in this PAC exist on Howard Mountain. These locations are > 0.5mi from the proposed trail. All portions of the trail are ~ 0.25 mi from the PAC boundary.

Coulter Ridge PAC – This PAC was established in 1989, when pair occupancy was inferred. The PAC was not monitored for many years, but was last monitored in 2012. A single male MSO was detected during this survey from both traditional night time surveys and MP3 recorders set in the PAC. The detections were within the established nest core. The largest cluster of recorded locations for this PAC are > 0.25mi away from the proposed trail within the nest core. A nest core ‘area’ has been established in this PAC, choosing the best habitat available. No actual nest has been found in this PAC to this date. A portion of the proposed trail would follow FR236A, which runs through the center of the PAC, and to the east of the nest core. This road is currently a designated Forest Service system road open to “all vehicles.”

Bonita Tank PAC – The Bonita Tank PAC was monitored in 1999 as a part of the demography study conducted by Chris May, Humboldt University. No response from MSO was recorded during that season. The last time an MSO was detected before the 1999 Demography Study in Bonita Tank PAC was 1996, when an adult male was found and nesting failure was recorded. Since 1999, Bonita Tank PAC was not surveyed until 2012. A single male MSO was detected within the PAC during traditional nighttime surveys and MP3 recorders set in the PAC, but not located during multiple daytime follow up visits. The majority of the detections were within the nest core close to the historic locations. The currently proposed trail route travels on FR 236A through the south west portion of the PAC. Forest Road 236A is currently designated for “all vehicles.” The historic nests and roosts are on the opposite side of Coulter Hill from the proposed trail, which will reduce sound and visual disturbance. This route is over 0.4 miles from the historic nest and roost locations.

Coyote Park PAC – The Coyote Park PAC was established in 1990 and monitored until 2003. Since 2003, the PAC was not surveyed. The Kelly Trails MSO Inventory (2012) had a pair response from the Coyote Park PAC area, but they were not found on a daytime follow-up search. The pair was heard during the visit, from the vicinity of the historic nest core. Currently the PAC is assumed to be occupied. The currently proposed trail route skirts the southwest side of the PAC along FR 9493C, which was not designated through the recent Travel Management decision. This nearest segment of the trail system is approximately 0.4 miles away from the established nest core. Table 14 displays Mexican Spotted Owl Habitat location within the Action Alternatives.

Table 14: Mexican Spotted Owl Habitat Location within Action Alternatives

MSO Habitat Type	Trail / Action Designation	Implementation	Alternative B Miles in Habitat	Alternative C Miles in Habitat
Restricted Habitat	Motorcycle	New Construction	5.38	5.72
		Road to Trail Conversion	0.11	1.43

		Roads Open to All Vehicles	0.0	0.31
		Adoption of User Trail	0.0	0.0
	OHV	New Construction	3.75	4.05
		Road to Trail Conversion	11.33	12.32
		Roads Open to All Vehicles	5.14	5.14
	Road Open to All Vehicles		0.0	0.0
	Decommission Road		1.71	1.71
MSO Habitat Type	Trail / Action Designation	Implementation	Alternative B Miles in Habitat	Alternative C Miles in Habitat
Target / Threshold	Motorcycle	New Construction	0.64	0.64
		Road to Trail Conversion	0	0
		Roads Open to All Vehicles	0	0
		Adoption of User Trail	0	0
	OHV	New Construction	0.38	0.38
		Road to Trail Conversion	1.58	1.58
		Roads Open to All Vehicles	2.18	2.18
	Road Open to All Vehicles		0.0	0.0
	Decommission Road		0	0

MSO Habitat Type	Trail / Action Designation	Implementation	Alternative B Miles in Habitat	Alternative C Miles in Habitat
Protected Habitat	Motorcycle	New Construction	0	0
		Road to Trail Conversion	0	0
		Roads Open to All Vehicles	0	0
		Adoption of User Trail	0	0
	OHV	New Construction	0	0.09
		Road to Trail Conversion	0	0.54
		Roads Open to All Vehicles	5.71	5.71
	Road Open to All Vehicles		0.0	.56
	Decommission Road		1.76	1.76

ENVIRONMENTAL CONSEQUENCES

Alternative 1 (No Action Alternative)

Direct and Indirect Effects

Under the no action alternative, current use trends would continue in the area. Recreational use, especially ATV/OHV and motorcycle use in the area is high (McGervey, Kelly Trails Recreation Specialist Report). Unauthorized trails abound throughout the area stretching from the Pulliam airport all the way south to Munds Park. These dispersed trails would continue to exist as no obliteration would occur through the Kelly Trails project. Also, roads within restricted and protected Mexican spotted owl habitat that would be decommissioned in Alternative B and C would continue to be administratively closed only. Many of these roads, without physical closure efforts, could continue to see occasional motorized use through illegal usage or permitted activities. The disturbance from these uses would continue in these areas, which total roughly 3.5 miles within MSO habitat.

Cumulative Effects

Projects identified from the cumulative projects list that may occur in Mexican spotted owl habitat are Grazing (Casner Park/Kelly Seep, Mud Springs, Windmill), Fuels and Forest Health Projects (Mountaineer Fuels Reduction, Munds Park Fuels Reduction, Howard/Priest Watershed), and Recreation projects (Munds Park Motorized Trails, Mountaineer Community Trails, TMR). Grazing may combine with proposed project activities from the removal of vegetative forage for prey species. Fuels and Forest Health projects may have short term disturbance associated with treatments, but are expected to provide long term benefit to spotted owl habitat by increasing forest health and reducing the possibility of catastrophic wildfire, an identified major threat to the recovery of the species. Recreational projects may increase disturbance in the areas of trail systems, but are expected to reduce noise and visual disturbance throughout the rest of MSO habitat by concentrating use on these systems and reducing widespread dispersed motorized use.

Activities that may cumulatively combine with the no action alternative are recreation projects that exist in the area such as the Munds Park Motorized Trails and Mountaineer Community Trails as these projects are associated with motorized recreation near or within spotted owl habitat, possibly combining with the motorized use from non-decommissioned trails and roads associated with the no action alternative. This combined impact is expected to be relatively small considering the overall use of the area from the public currently.

Alternative B (Proposed Action)

Direct and Indirect Effects

The Restricted and Protected Habitat in this area has been surveyed through multiple projects over a long period of time (see existing conditions section), and no owls have been documented nesting or roosting outside of existing PACs.

Mexican spotted owls have been shown to be sensitive to visual and noise disturbance related to human activity and recreation (Delaney and Grubb 2004, Delaney et al. 1999, Swarthout and Steidl, 2001). Current Arizona law requires that all off highway vehicles be equipped with a muffler that allows no more than 96 decibels to be emitted, and this is roughly equivalent to helicopter noise emission from Delaney's study. Delaney (1999) showed that Mexican spotted owls did not flush from chainsaw or helicopter disturbance at a distance greater than 105m (0.06 mi) away. All proposed trail locations (except that along FR236A in Alternative C) are more than 0.25mi from any established PAC, minimizing both visual and noise disturbance along these sections of trail.

FR236A is a road designated for "all vehicles" that experiences frequent traffic from motor vehicles and motorized recreation through the summer and fall. Considering the high amount of mixed motorized use that already occurs along this road, the designation of a portion of this trail on FR236A does not represent a significant increase in noise disturbance to MSO.

The designation of this trail system would result in ~10 miles of new trail construction within restricted habitat for Mexican spotted owl. This is equivalent to roughly 2.18 acres of motorcycle trail and 2.58 acres of OHV trail acres of permanent ground disturbance. This removal of habitat is not one single portion of land however, but rather is located in small segments throughout the

trail system. This minimizes the disturbance to the area, as the habitat around the 36 inch (Moto) or 62 inch (OHV) trail creation would still continue to function as habitat for MSO prey species, as opposed to an entire 5 acre block that would cease to function in this way. No large trees or snags would be removed for trail construction. Additionally, down woody material that provides prey habitat would be retained along portions of new trail construction as a design feature. This would help in ensuring that small mammal habitat would continue to exist through these areas. While larger forest roads have been shown to function as barriers to some small rodent's movement, these roads are 10-40 feet in width and present a much different obstacle than the proposed trails, which are 18-36 inches wide for motorcycle trails, and 62 inches for OHV trails. It is not expected that these trails, being much smaller, would present an obstacle for small mammals to move across (Forman, 1998). Closed roads that will be converted to trail are currently in a disturbed state. These roads over time would have returned to a natural state. With their conversion to trail only a portion of the road bed will be naturalized, and motorized disturbance will remain in the area when it previously would not have. Through surveys and historical data, it is apparent that spotted owls are likely not nesting or roosting within ¼ mi of these areas, and disturbance from these sections of trail is likely minimal to nonexistent.

Air pollution from ATV and motorcycle exhaust effects on wildlife is an actively researched subject. There have been records of toxic effects from air pollution to wildlife from industrial point sources of pollution (Newman, 1988). The emissions from vehicles on this trail system are considered non-point sources, and their effects on wildlife are not well known. Vehicle emissions produce a range of gases and particles. Some of those particles may persist for hours or years in the atmosphere, but most airborne pollutants that cause local effects dissipate within moments to hours (Forman et al, 2003). In addition, local wind dynamics and topography also play an important role in the quick dispersal of vehicle emissions on the Coconino National Forest. As technology improves and vehicle emissions continue to be reduced, there will be less impact as time progresses, though there likely will continue to be increased motorized recreation in general as has been the case in recent decades. Under these considerations, it is not expected that ATV and motorcycle trail riding exhaust/air pollution will cause any significant or measureable effect to Mexican spotted owls.

A positive effect on MSO and their habitat as part of both alternatives is the decommissioning of multiple roads that occur in the project area that provide access to sensitive wildlife habitat. Approximately 1.71 miles of roads would be obliterated in MSO restricted habitat, and 1.76 miles in MSO protected habitat, with no roads planned to be decommissioned in target/threshold habitat. The majority of the mileage of the roads in protected habitat is FR 235B, which travels directly through the nest core of the Lake #1 Seruchos PAC. This road decommissioning would be completed outside of the breeding season, which runs March 1 – August 31. The actual obliteration of these roads would be a positive effect because these roads that are closed administratively could continue to experience incidental use as long as there is access. This decommissioning would completely remove access, and thus disturbance from motor vehicles to MSO in these areas as well as aiding in a faster naturalization of the area.

The two planned trailheads and parking lots are outside of identified Mexican spotted owl habitat. For a general breakdown of the mileage of types of trails within MSO habitat, refer to table 13.

Cumulative Effects

Projects identified from the cumulative projects list that may combine cumulatively to affect Mexican spotted owls are Grazing (Casner Park/Kelly Seep, Mud Springs, Windmill), Fuels and Forest Health Projects (Mountaineer Fuels Reduction, Munds Park Fuels Reduction, Howard/Priest Watershed, 4FRI), and Recreation projects (Munds Park Motorized Trails, Mountaineer Community Trails, TMR). Grazing may combine with proposed project activities from the removal of vegetative forage for prey species. Fuels and Forest Health projects may have short term disturbance associated with treatments, but are expected to provide long term benefit to spotted owl habitat by increasing forest health and reducing the possibility of catastrophic wildfire, an identified major threat to the recovery of the species. Recreational projects may increase disturbance in the areas of trail systems, but are expected to reduce noise and visual disturbance throughout the rest of MSO habitat by concentrating use on these systems and reducing widespread dispersed motorized use.

Determination of Effect

Alternative B would have positive effects on MSO by obliterating roads within MSO Protected Activity Centers, specifically 1.76 miles within the Lake #1 Seruchos PAC, and 1.71 miles within general MSO restricted habitat. The physical obliteration and closure of these roads would reduce easy access to these areas by motorized vehicles and the disturbance to possible nesting and roosting MSO within these areas.

New trail creation and designating closed roads as motorized trails for both motorcycle and OHVs would occur within restricted habitat. The creation of new trails and change in designation of existing closed roads would retain key habitat components and function, including providing for small mammal populations. Motorized trail will be designated on existing open roads in 2 PACs. No new trail will be constructed in PACs. All trail segments are greater than 0.25mi away from known nest and roost locations, eliminating or reducing noise and visual disturbance to spotted owls. The portion of the OHV trail that would be designated on FR236A does not represent a change in the current disturbance level on the road, as existing motorized use along this route is moderate (Mcgervey P. , pers. comm).

Based on the effects discussion above, and considering that all trails except one section (which is along FR 236A, a frequently travelled open Forest Service road) are greater than 0.25 mi from any MSO nest location, that the ground disturbance would not impair the local habitat from functioning as prey and MSO supporting habitat nor remove key habitat components, that roads would be obliterated that access sensitive MSO nest cores and habitat, *I find that this alternative may affect, but is not likely to adversely affect Mexican spotted owls.*

Alternative C

Direct and Indirect Effects

Alternative C would have all of the same effects considerations as Alternative B as the two actions have similar proposed activities. Alternative C does include some additional trail segments and thus has more mileage within MSO protected and restricted habitat types. Alternative C also includes consideration of 16 miles of trail and a section of trails designed for observed trails riding for special use events. As part of Alternative C, these events could be allowed along the motorcycle only segments of trail, on the west side of the project area. These areas are outside of all PACs. Future events that might be planned such as motorcycle races could

possibly represent an increase in the current disturbance threshold within restricted MSO habitat. These areas have been surveyed this year and have been found not to be occupied by Mexican spotted owls and thus would have no affect to the species. However, as a standard permitting procedure, these events would be evaluated on a case-by-case basis by District Biologists, and generally would not be permitted when significant species concerns are identified, or if noise thresholds exceed existing disturbance levels within PACs.

In restricted MSO habitat, Alternative C would designate approximately 5.72 miles of new construction motorcycle trail and 4.05 miles of OHV new construction trail. It would also designate 1.43 miles of motorcycle and 12.32 miles of OHV closed road-to-trail conversions, and would also designate a total of 5.45 miles of open road to be included as part of the OHV and motorcycle trail system. In target/threshold (a subset of restricted habitat), there would be 0.64 miles of new construction motorcycle trail. For OHV trails, there would be 2.18 miles of open road inclusion, 1.58 miles of closed road conversion, and 0.38 miles of new trial construction. In protected habitat, Alternative C would include 0.09 miles of new OHV trail construction, 0.5 miles of closed road conversion to OHV trail, and would utilize 5.7 miles of open Forest Service system roads. Lastly, Alternative C would designate 0.5 miles of a closed road to be open to all motor vehicles that lies within protected MSO habitat.

Compared to Alternative B, Alternative C would have approximately 1 more mile of OHV closed road to trail conversion, 0.3 miles of OHV new trail construction, and 0.002 miles of open road in the OHV trail segment in MSO restricted habitat. Alternative C would also have 0.36 more miles of motorcycle new construction, 0.31 more miles of motorcycle open road use, and 1.3 more miles of motorcycle road to trail conversion in restricted habitat.

In protected habitat, Alternative C would include 0.54 more miles of OHV closed road conversion, 0.09 miles of new OHV trail construction, and 0.56 miles of all vehicles closed road to be opened than Alternative B.

This small increase in mileage likely would not represent much of an increase in noise or visual disturbance to MSO above what Alternative B would create. The additional habitat disturbed on the ground from new trail construction compared to Alternative B is 0.11 acres of motorcycle trail and 0.14 acres of OHV trail.

The technical trail section on the north end of the project area is not within MSO habitat. Both planned new trailhead creation areas are located outside of MSO habitat as well. These activities would have no effect to Mexican spotted owls.

Cumulative Effects

The Cumulative effects analysis for Alternative C is very similar to Alternative B, differing only in the amount of trail created within it. The same projects could combine cumulatively, but only to a slightly higher degree.

Determination of Effect

Based on the effects discussion above, and considering that all trails except one section (which is along FR 236A, a frequently travelled open Forest Service road) are greater than 0.25 mi from any MSO nest location, that the ground disturbance would not impair the local habitat from

functioning as prey and MSO supporting habitat nor remove key habitat components, that roads would be obliterated that access sensitive MSO nest cores and habitat, *I find that this alternative may affect, but is not likely to adversely affect Mexican spotted owls.*

Mexican Spotted Owl Critical Habitat

EXISTING CONDITIONS

Mexican spotted owl critical habitat as delineated within the Mexican spotted owl recovery plan does exist within the project boundary. Mostly, this habitat type is Ponderosa pine/Gambel oak habitat. Primary constituent elements analyzed in this project include 40 percent shade canopy, large snags, high volumes of fallen trees and woody debris, and adequate levels of residual plant cover to maintain fruits, seeds, and allow regeneration. These elements were identified from the Recovery Plan/Critical Habitat Designation Rule as possibly having effects from the establishment and creation of a motorized trail system.

Alternative A (No Action Alternative)

Direct and Indirect Effects

Under the no action alternative, current use trends would continue in the area. Recreational use, especially ATV/OHV and motorcycle use in the area is high (McGervey, Kelly Trails Recreation Specialist Report). Unauthorized trails abound throughout the area stretching from the airport all the way south to Munds Park. These dispersed trails would continue to exist as no decommissioning would occur through the Kelly Trails project. Also, roads within restricted and protected Mexican spotted owl habitat that would be decommissioned in Alternative B and C would continue to be administratively closed only. Many of these roads, without physical closure efforts, could continue to see occasional motorized use through illegal usage or permitted activities. The disturbance from these uses would continue in these areas, which total roughly 3.5 miles within MSO habitat.

Cumulative Effects

Activities that may cumulatively combine with the no action alternative are recreation projects that exist in the area such as the Munds Park Motorized Trails and Mountaineer Community Trails as these projects are associated with motorized recreation near or within spotted owl habitat, possibly combining with the motorized use from non decommissioned trails and roads associated with the no action alternative. This combined cumulative impact is expected to be a relatively small change based on the current overall use of the area from the public.

Alternative B (Proposed Action)

Direct and Indirect Effects

Under the proposed action, there would be 5.36 miles of motorcycle single track new trail construction and 3.75 miles of OHV new trail construction in restricted habitat. In protected habitat, there would be no new trail construction. Also, Alternative B would designate the obliteration of 1.71 miles of road in restricted habitat, and 1.75 miles of road in protected habitat. This road obliteration would physically close the roads, returning them to a more natural state and

preventing the continued use of these areas by motorized vehicles. This would be a positive effect to MSO critical habitat. In MSO target/threshold habitat, there would be 0.64 miles of new motorcycle trail construction, and 0.38 miles new OHV trail construction of road to trail conversion, and 2.18 miles of open road use. The total number of acres of habitat removed from new trail construction and closed road conversion in restricted habitat is 12.88 acres, and 0 acres in protected habitat. Road obliteration would restore 2.07 acres in restricted habitat, and 2.13 acres in protected habitat. Acres removed would reduce the amount of residual plant cover, but would still allow adequate levels of plants in the area to maintain fruits, seeds, and allow regeneration.

Design features dictate that down woody material would be retained during trail creation in the area, but shifted out of the way. Additionally, large snag and tree removal would be avoided by micro route planning. This would keep the down woody habitat component intact, as well as maintain the canopy cover in areas of trail creation.

The creation of these trails is expected to concentrate the wide, dispersed use upon the new system, reducing ground and vegetative impacts across the area. The conversion of closed roads to OHV and single track motorcycle trail also returns the extra width of the road not needed for trail to a natural state, which otherwise would possibly remain in a disturbed state from continued large vehicle use. Both planned trailheads are outside of MSO habitat.

Cumulative Effects

Actions and projects that have occurred in the area or may occur in the future that may combine with the impacts associated with this alternative include recreation projects (Mountaineer Community Trails, Munds Park Motorized Trails), the Travel Management Rule, and Fuels and Forest Health projects (Mountaineer Fuels Reduction, Munds Park Fuels Reduction, and 4FRI). The establishment of recreational motorized trails in the area already may combine in the removal of MSO habitat with the Kelly Trails Project, although road and trail obliterations tied with the project offset much of this acreage. Forest Health projects may have a short term (up to one year) negative impact from prescribed burns and mechanical treatments that would cumulatively combine with habitat impacts from new construction of trails. These activities are expected to promote long term improvement of MSO habitat and would cumulatively combine with the effects of road decommissioning to increase the quality and quantity of primary constituent elements over the long-term (one to ten years after project implementation).

Determination of Effect

Considering the above discussion, I find that this alternative *may affect, but is not likely to adversely affect Mexican spotted owl Critical Habitat*.

Alternative C

Direct and Indirect Effects

Under Alternative C, in restricted habitat, there would be 6.3 miles of motorcycle single track new trail construction, 1.4 miles of road to trail conversion, and 0.3 miles of open road inclusion. There would be 4.4 miles of OHV new trail construction, 12.8 miles of closed road conversion, and 6.9 miles of open road inclusion. In protected habitat, there would be 0.09 miles of OHV new

trail construction, 0.54 miles of closed road OHV conversion, and 5.7 miles of open road inclusion. Lastly, there would be 0.56 miles of closed road reopened to all vehicles within protected habitat. Alternative C would decommission 1.71 miles of road in restricted habitat, and 1.76 miles of road in protected habitat. This road decommissioning would physically close the roads, returning them to a more natural state and preventing incidental use of these areas by motorized vehicles. This would be a positive effect to MSO critical habitat. In MSO target/threshold habitat, there would be 1.02 miles of new trail construction, 1.58 miles of road to trail conversion, and 2.18 miles of open road use. The total number of acres of habitat removed from new trail construction and closed road conversion in restricted habitat is 14.29 acres, and 1.06 acres in protected habitat. Road obliteration would restore 2.07 acres in restricted habitat, and 2.13 acres in protected habitat. Acres removed would reduce the amount of residual plant cover, but would still allow adequate levels of plants in the area to maintain fruits, seeds, and allow regeneration.

Design features dictate that down woody material would be retained during trail creation in the area, but shifted out of the way. Additionally, large snag and tree removal would be avoided by micro route planning. This would keep the down woody habitat component intact, as well as maintain the canopy cover in areas of trail creation.

The creation of these trails is expected to concentrate the wide, dispersed use upon the new system, reducing ground and vegetative impacts across the area. The conversion of closed roads to OHV and single track motorcycle trail also returns the extra width of the road not needed for trail to a natural state, which otherwise would possibly remain in a disturbed state from continued large vehicle use.

Planned trailheads are outside of MSO habitat and would have no effect.

Cumulative Effects

The cumulative effects for Alternative C are similar to those identified for Alternative B, the only difference being that slightly more acreage is being used for trail creation, which would combine cumulatively with mechanical fuel treatments, prescribed fire, and other non-motorized recreational trail projects in the area that impact MSO Critical Habitat. The effects therefore will be slightly more, but are not expected to change the effects determination.

Determination of Effect

Considering the above discussion, I find that this alternative *may affect, but is not likely to adversely affect Mexican spotted owl critical habitat.*

Forest Service Sensitive Species

Northern Goshawk

The northern goshawk (*Accipiter gentilis*) is a forest habitat generalist that utilizes a wide variety of forest stages. It occupies ponderosa pine, mixed conifer, and spruce-fir forest types in the Southwest. All forested habitat above the Mogollon rim is considered to be goshawk habitat, including any associated pine or mixed conifer stringers that may extend below the rim.

The northern goshawk is a medium to large sized forest dwelling raptor that preys on large to medium sized birds and mammals which it captures on the ground. It prefers stands of intermediate canopy cover for nesting, while more open areas are used for foraging.

EXISTING CONDITIONS

Three post-fledgling Family Areas (PFA) exist within 0.3 mile of the currently proposed trail system. These are Seruchos (ACGE#405002), Pumphouse (ACGE#405007), and Mud Lake (ACGE#405010). No trails are proposed in any of the PFAs for either action alternative.

Seruchos (ACGE#405002) – This PFA was last surveyed in 2008, in which no adults were seen or heard, and no signs of occupancy were observed. The last time goshawks were detected in this PFA was in 1992, when nesting was confirmed with 2 young produced. Known nests are more than 0.3 mi distant from the currently proposed trail system. No trails are proposed within the PFA.

Pumphouse (ACGE#405007) – Pumphouse PFA was established in 1985 after an unidentified adult goshawk was seen. Nesting was unknown at that time. Since then, no goshawks have been detected in the PFA despite multiple years of surveying. The last year of survey was 2007, with no goshawks detected. The 1985 nest is greater than 0.5 mi from the currently proposed trail. No trails are proposed within the PFA.

Mud Lake (ACGE#405010) – The Mud Lake PFA was established in 1990 with the sighting of an unidentified adult goshawk. The following year, a pair successfully fledged 1 young. The last year this PFA was surveyed was in 1993 when an unidentified adult goshawk was seen. Since that time, this PFA has not been surveyed and no sightings in the PFA have been reported. No trails are proposed within the PFA.

Alternative A (No Action Alternative)

Direct and Indirect Effects

Under the no action alternative, motorized use of the area would continue. Trails and roads planned to be decommissioned through the Kelly Trails project would remain administratively closed only. The recovery of these areas would be slowed without the physical closures of these roads, though it is expected to recover in time.

Cumulative Effects

Cumulative impacts from the non-decommissioning of 14 miles of roads within the project area would likely occur over the next ten years (additional time it would take for non-decommissioned roads to naturally revegetate) within the project area. Not decommissioning the 14 miles of road could combine cumulatively with other activities that result in disturbed areas where the loss of understory vegetation and lack of downed debris negatively effects prey species. Activities such as pile burning and mechanical thinning from projects including Mountaineer Fuels Reduction, Munds Park Fuels Reduction, and 4FRI; and recreational trail development resulting from Mountaineer Community Trails, Munds Park Motorized Trails would result in areas of bare soils that would cumulatively combine the area of land lacking understory vegetation to support

goshawk prey. These areas would generally not be connected with each other and would thus have little impact to small mammal populations in the project area.

Alternative B (Proposed Action)

Direct and Indirect Effects

While none of the trails pass within a PFA, some trails do fall within 0.3 miles of Seruchos, Pumphouse, and Mud Lake PFAs. Because these PFAs have not had recent monitoring, it is unknown where these birds, if they exist, may be nesting. If they have selected a nest site within this distance, it is possible they may experience some measure of noise disturbance. The historic motorized use of the area has been high, and these birds have likely developed some level of tolerance for these motorized disturbances.

Under Alternative B, of single track motorcycle trail there would be 25 miles of new construction, 3.2 miles of road to trail conversion, and 6.3 miles of user trail adoption within goshawk habitat. For OHV trails there would be 6.9 miles of new construction, 17 miles of closed road conversion, and 11 miles of open road incorporation in goshawk habitat.

The disturbance associated with a trail loop of this length means that motorized use would pass through any given area quickly, and would not be a cyclic, chronically repeated use from the same user again and again in a short time frame. Foraging goshawks may experience some of this disturbance, but are expected to have minor effects from it due to the short duration of the noise. Additionally, there would be 13.7 miles of roads and trails that would be decommissioned within goshawk foraging habitat, of which there are 2.74 miles within PFAs. This road decommissioning would physically close the roads, preventing illegal or permitted motorized use upon them. This would reduce disturbance in these areas, as well as quickly return the area to functional prey habitat for goshawks.

In general, human activities have been documented to cause disturbance to raptors and in many instances can cause nest abandonment or changes in home range (Anderson et al. 1990). Monitoring of motorized use on northern goshawk, however, has showed very little effect on individual goshawks, causing biologists to consider motor vehicle use a 'minor stressor' (Slauson and Zielinski 2008). A noise study on goshawks conducted by Grubb et al. (1998) found that logging trucks did not elicit a discernible response when they passed within 0.3 mile (500 meters) of active nests.

In addition to disturbance impacts from motor vehicle use, repeated motor vehicle use may result in the loss of ground vegetation. The loss of ground vegetation can affect prey species including small mammals that are dependent on understory vegetation and downed woody debris.

Cumulative Effects

Past, present, and future actions that may have a cumulative effect with Alternative B are Fuels and Forest Health Projects (4FRI) and recreation projects (Munds Park Motorized Trails, Mountaineer Community Trails), as well as the Travel Management Rule (TMR). Fuels and Forest Health projects may have short term disturbance associated with treatments, but are expected to provide long term benefit to northern goshawk habitat by increasing forest health and

reducing the possibility of catastrophic wildfire. Recreational projects disturbance effects may combine with the disturbance in the areas of trail creation. Given the high amount of motorized use that has been occurring and will continue in the future, this combined effect is expected to be slightly higher, though will not increase the amount to change the determination of effect.

Determination of Effect

Considering the above discussion, I find that this alternative may impact individuals but is not likely to result in a loss of viability or trend toward federal listing.

Alternative C

Direct and Indirect Effects

Under Alternative C, of single track motorcycle trail there would be 35 miles of new construction, 8.0 miles of road to trail conversion, and 6.5 miles of user trail adoption within goshawk habitat. For OHV trails there would be 10 miles of new construction, 20 miles of closed road conversion, and 14 miles of open road incorporation within potential goshawk habitat.

The effects from Alternative C will be similar to those outlined in Alternative B, save that the amount of trail mileage is increased by approximately 7 miles. These additional miles are not within PFA boundaries or within .3 miles of a PFA. The disturbance associated with this increased mileage is slightly higher, but again will not raise the amount of disturbance to goshawk from motor vehicle use to a large degree.

Cumulative Effects

The Cumulative effects from Alternative C will be similar to Alternative B, though the magnitude of combined effects would be slightly larger. This is not expected to be an amount that will change the determination due to its small increase.

Determination of Effect

Considering the above discussion, this alternative may impact individuals but is not likely to result in a loss of viability or trend toward federal listing.

Navajo Mogollon Vole, Long-tailed Vole, Merriam's Shrew

Navajo Mogollon voles (*Microtus mogollonensis navaho*) occupy a variety of habitats which include meadows and riparian areas above the Mogollon Rim as well as low tree density, forested areas. Kime (1994) also found that they can be located in dry, grassy areas adjacent to ponderosa pine forest but sometimes as low as juniper woodland or stands of sagebrush, or as high as spruce-fir. Hoffmeister (1986) has delineated the range for this vole from Navajo Mountain southward to the western part of the Mogollon Plateau from near Mormon Lake westward to the vicinity of Williams. Locations have been reported from 3,800 to 9,700 feet in elevation with a number of locations around San Francisco Peaks area. These voles occur within low tree density, forested areas. They can be found in dry, grassy areas adjacent to ponderosa pine forest but sometimes as low as juniper woodland or stands of sagebrush, or as high as spruce-fir (Kime, 1994).

Long-tailed voles (*Microtus longicaudus*) are widespread but usually uncommon in the west in areas with good low lying vegetative cover such as forest edges, stream sides, and thickets. In Arizona, the long-tailed vole is discontinuously distributed, occurring within Coconino County on the Kaibab Plateau and the San Francisco Peaks (Hoffmeister 1986). These voles occupy meadows, grassy valleys, grassy clearings in forests, sagebrush flats, and rocky slopes within coniferous forests. Specifically, long-tailed vole habitat can be found in alpine-tundra, mixed conifer, montane subalpine grassland, and spruce-fir vegetative types.

Merriam's shrews (*Sorex merriami leucogenys*) are distributed throughout the west. In Arizona, this mammal occurs primarily along the Mogollon Rim (Hoffmeister 1986). This shrew is an insectivorous mammal that inhabits cool, grassy places near coniferous forests and dry places often near water but not along streams. Other habitat characteristics include herbaceous ground cover, moist soils, logs and coarse woody debris. Habitat types associated with Merriam's shrew are grasslands interspersed with water, wetland cienegas, and montane subalpine areas.

EXISTING CONDITIONS

Mogollon Navajo vole - Possible habitat for the Navajo Mogollon vole occurs in the project area where sufficient herbaceous cover and food exists in the ponderosa pine vegetation type. Of the total 77.24 miles of proposed trail, 71.58 miles of trail exist within the ponderosa pine management area, and 1.42 miles of proposed trail cross the mountain grasslands management area where the vole also could potentially occur.

Long Tailed Vole - Of the Forest Management Areas within the project area, long-tailed vole habitat could occur within the Mountain Grassland Management Area type. Of the total 77.24 miles of proposed trail, 1.42 miles (<2%) fall within or cross the Mountain Grassland management area type. Surveys for long-tailed voles have not been conducted on the Forest.

Merriam's shrew - Of the Forest Management Areas within the project area, Merriam's shrew habitat could occur within the Mountain Grassland Management Area type. Of the total 77.24 miles of proposed trail, 1.42 miles (<2%) fall within or cross the Mountain Grassland management area type. No comprehensive surveys have been completed for this species on the Forest. Though there is potential habitat for Merriam's shrew within the project area, no known occupancy exists.

Alternative A (No Action Alternative)

Direct and Indirect Effects

Mogollon vole, Long-tailed vole, and Merriam's shrew - Under the no action alternative, 14 miles of closed roads and unauthorized trails within vole and shrew habitat would not be decommissioned, so the recovery process for these roads and trails would occur at a slower rate than that of the action alternatives. This slower recovery is still expected to occur within approximately a decade.

Cumulative Effects

Impacts that occur from not decommissioning roads would be short-term (up to ten years) and would combine with other projects that disturb vole habitat such as forest restoration efforts including Mountaire Fuels Reduction, Munds Park Fuels Reduction and 4FRI; and such as other

trail projects such as Munds Park Motorized Trails, Mountaineer Community Trails. Together these projects would result in a cumulative increase in disturbance to vole habitat for up to ten years. Disturbance related to restoration projects would last from 1-5 years, whereas trail projects would last for more than a decade, but would be of very small size.

Alternative B (Proposed Action)

Direct and Indirect Effects

Navajo Mogollon vole - Alternative B would create 25 miles of new motorcycle trail, 4 miles of closed road to single track trail creation, and 6 miles of unauthorized trail within vole habitat. There would also be 7 miles of OHV new trail construction, 17 miles of closed road conversion, and 11 miles of open road use within potential Mogollon vole habitat. The creation of new trails within Mogollon vole habitat would remove approximately 13.46 acres of potential habitat. The creation of 2 trailheads within Mogollon vole habitat would remove 1.4 acres. This habitat removal is in 2 single blocks of habitat, and would remove the area from vole use. This removal however is not expected to cause a loss of viability for the species or cause a trend toward federal listing.

Long-tailed vole - Alternative B would create 0.42 miles of new motorcycle trail, 0.78 miles of closed road to single track trail creation within potential long-tailed vole habitat. There would also be 0.12 miles of OHV new trail construction, and 0.1 miles of closed road conversion. The creation of new trails within long-tailed vole habitat would remove approximately 0.22 acres of potential habitat.

Merriam's shrew - Alternative B would create 0.42 miles of new motorcycle trail, 0.78 miles of closed road to single track trail creation within grassland vegetation types. There would also be 0.12 miles of OHV new trail construction, and 0.1 miles of closed road conversion within those types. The creation of these new trails within Merriam's shrew habitat would remove approximately 0.22 acres of potential habitat.

The conversion of closed roads to motorcycle trails would allow re-vegetation to occur more quickly along the margins of the former road not being used as trails as the margins would be obliterated and rehabilitated as part of the trail creation, and improve the permeability for small rodents of these trails as compared to the road surface that existed there before. This acreage is spread over many miles of trails, rather than as one discrete block, and thus the areas nearby would continue to function as habitat. The creation of these well developed system trails would focus motorized use on them, and thus reduce dispersed use through potentially-occupied vole and shrew habitat. Additionally, important small mammal habitat components such as down logs and woody material would be retained as much as possible during trail construction. Some mortality from machinery for trail creation and naturalization or trail/road obliteration could occur, but this is expected to happen in relatively few occurrences.

It has been shown that roads create barriers to small mammal movement (Swihart and Slade, 1984). The trails proposed are significantly smaller than forest roads, 18-36 inches for motorcycles and 62 inches for OHVs compared to 14 feet for a typical forest road prism (with additional areas for maintaining shoulders, leadout ditches, etc., making the total width approximately 20 feet). While studies regarding trails of this size are few, it is logical to reason that these much smaller trails would function as less of a barrier to movement. Some direct

mortality from collisions with motorized vehicles could occur; however these incidents are expected to be relatively few as voles and shrews would move through areas of bare ground quickly if at all, and stay within their established runways which would minimize collisions.

Additionally, the decommissioning of roads within the habitat of these animals would add habitat more quickly than if not decommissioned.

Cumulative Effects

Projects identified from the cumulative projects list that may occur in Navajo Mogollon vole, Long-tailed vole, and Merriam's shrew habitat are grazing (Casner/Kelly Seep, Mud Springs, and Windmill allotments), fuels/forest health projects (Mountaineer Fuels Reduction, Munds Park Fuels Reduction, and Howard/Priest Watershed), historic wildfires (Bolt Wildlife), and recreation projects (Munds Park Motorized Trails, Mountaineer Community Trails). These projects may combine with proposed project activities from the removal of vegetative forage for voles and shrews associated with grazing and possible direct mortality associated with vehicle use. Fuels and forest health projects may have immediate, short term effects or possibly mortality from machinery, but are expected to have a long term beneficial impact from improved forage and health of vole and shrew habitat. Prescribed burning associated with these projects may also have short term, harmful effects, but contribute to long term habitat health and future population increases for voles and shrews. The Travel Management Rule (2011) will have positive impacts to voles by reducing off-road motorized vehicle travel in vole and shrew habitat.

Determination of effect

Based on the discussion above, I find that this alternative may impact individuals but is not likely to result in a loss of viability or trend towards federal listing for the Navajo Mogollon vole, the Long-tailed vole, and the Merriam's shrew.

Alternative C

Navajo Mogollon vole - Alternative C will create 32 miles of new motorcycle trail, 8.5 miles of closed road to single track trail creation, and 6 miles of user created trail inclusion within Mogollon vole habitat. There will also be 10 miles of OHV new trail construction, 20 miles of closed road conversion, and 14 miles of open road use in Mogollon vole habitat. The creation of new trails within Mogollon vole habitat from Alternative C would remove approximately 18 acres of potential habitat. The creation of 2 trailheads within Mogollon vole habitat would remove 1.4 acres (.7 acres each). This habitat removal is in 2 single blocks of habitat, and would remove the area from vole use. This removal however is not expected to cause a loss of viability for the species or cause a trend toward federal listing. The decommissioning of roads planned with Alternative C (approx. 13 miles), would restore 32.3 acres of Mogollon vole habitat.

Long-tailed vole - Alternative C would create 0.42 miles of new motorcycle trail, 0.78 miles of closed road to single track trail conversion, 0.002 miles of unauthorized trail designation, and 0.89 miles of roads designated as all vehicles. There would also be 0.12 miles of OHV new trail construction, and 0.1 miles of designation of closed roads. The creation of new trails within Long-tailed vole habitat would remove approximately 0.22 acres of potential habitat. Proposed trailheads are not within Long-tailed vole habitat. Road decommissioning proposed with

Alternative C would restore 1.28 miles of road, or approximately 3.1 acres of Long-tailed vole habitat.

Merriam's shrew - Alternative C would create 0.42 miles of new motorcycle trail, 0.78 miles of closed road to single track trail conversion, 0.002 miles of designation of unauthorized trails, and 0.89 miles of open road use within grassland habitat. There would also be 0.12 miles of OHV new trail construction, and 0.1 miles of designation of closed road. The creation of new trails within Merriam's shrew habitat would remove approximately 0.22 acres of potential habitat. Proposed trailheads are not within Long-tailed vole habitat. Road decommissioning proposed with Alternative C would restore 1.28 miles of road, or approximately 3.1 acres of Merriam's shrew habitat.

Cumulative Effects

Effects from Alternative C are similar to those discussed in Alternative B, with the difference being that slightly more trails would be created in potential vole and shrew habitat. This would have a slightly larger impact on the amount of habitat removed and thus would have a slightly larger cumulative impact, however the difference is small compared to the amount of habitat on the Forest. The chance of direct mortality from the extra trails and road creation/decommissioning is slightly higher as well.

Determination of Effect

Based on the discussion above, I find that this alternative may impact individuals but is not likely to result in a loss of viability or trend towards federal listing for the Navajo Mogollon vole, Long-tailed vole, and Merriam's shrew.

Spotted bat, Allen's lappet-browed bat, Pale Townsend's big-eared bat

Spotted bats (*Euderma maculatum*) are thought to be widely distributed across Arizona, though still quite rare. There are no documented populations on the Forest. Spotted bats are found to occur mostly in dry, desert-scrub in Arizona, but range up to ponderosa pine. Most localities where they are known to occur have nearby cliffs and water sources. Roost characteristics are poorly known for this species, but they are thought to be dependent on large isolated cliffs for roosting, possibly singly in cracks and crevices. This species is a habitat generalist and could forage across the entire forest.

Allen's lappet-browed bats (*Idionycteris phyllotis*) have been found in a wide variety of habitats across Arizona including Mohave desert scrub, Mexican woodland, pinyon-juniper, ponderosa pine and white fir forests. They are often associated with water (whether for feeding or drinking is unclear), and Hoffmeister (1986) documents the occurrence of Allen's lappet-browed bats in mine shafts or rocky areas and cliffs for roosts. A study (Solvesky and Chambers 2009) conducted on the Coconino National Forest also documented lappet-browed bats using snags as roost sites, which is suspected to be common. This report also showed a positive correlation between these tree roost sites and proximity to forest roads. The reason for this association is unclear, but the authors speculate that the roads provide clearings for flight corridors.

Pale Townsend's big-eared bat (*Corynorhinus townsendii pallescens*) are widespread in Arizona, having been documented in nearly all counties, Coconino County included. In Arizona, summer

day roosts are found in caves and mines from desert-scrub up to woodlands and coniferous forests. Night roosts may often be in abandoned buildings. In winter, they hibernate in cold caves, lava tubes and mines mostly in uplands and mountains from the vicinity of the Grand Canyon to the southeastern part of the state. Townsend's big-eared bats were not documented using ephemeral trees/snags as roosts on the Coconino although they likely do based on their documented use in other areas they inhabit. Ponderosa pine forest types are habitat for this species within the project area.

EXISTING CONDITIONS

For spotted bats, there are no roost locations known to occur on the Forest. As a habitat generalist, spotted bats could possibly forage across the project area. Road and trail development are not thought to impact this canopy foraging species. No large cliff faces have been identified in the project area. The closest possible roost locations may exist in Kelly and James Canyon on the west side of I-17, approximately 1 mile from the proposed trail system.

For Allen's lappet-browed bats, no known ephemeral tree roosts have been documented within the project area, though it is assumed that they do forage through the area and could possibly have roosts within the area. No known caves or cliff faces occur within the project area. The closest locations for possible cliff roost sites would be in Kelly and James Canyons on the west side of I-17 approximately 1 mile from the proposed trail system. The nearest caves exist over two miles from the closest trail segment.

For Pale Townsend's big-eared bats, no caves have been documented within the project area. The nearest known cave where Pale Townsend's big-eared bats have been documented is Crucifixion Cave, a little over 4 miles to the east.

Alternative A (No Action Alternative)

Direct and Indirect Effects

Under the no action alternative, roads and trails planned for obliteration/naturalization will remain administratively closed only. This will slow the return of these areas to a natural vegetative community, as possible habitat for insects. This effect is so small that it would be discountable. Therefore, there would be no direct or indirect effects.

Cumulative Effects

There are no direct or indirect effects, therefore there are no cumulative effects.

Alternative B (Proposed Action)

Direct and Indirect Effects

Under Alternative B, no trails or routes, decommissioning, or the parking areas would be located near large cliff faces, and the nearest caves would be over 2 miles away from the system. Micro route trail planning would be used to avoid cutting any snag that may provide roosting habitat for bats. A small amount of habitat reduction may impact insect reproduction, particularly in

grasslands, but this is expected to be very minor as the trails through grasslands are 3-5 feet wide and are approximately only 0.5 miles in length.

Cumulative Effects

Projects identified from the cumulative projects list that may occur in spotted bat, Allen's lappet-browed bat, pale Townsend's big-eared bat habitat are grazing, fuels/forest Health projects and historic wildfires. These projects may combine with proposed project activities from the removal of vegetative forage for insects associated with grazing. Fuels and Forest health projects may have immediate, short term effects in noise disturbance in roosting bats in ponderosa pine snags, but are expected to have a long term beneficial impact from improved forage and health of bat habitat, and the reduction of catastrophic wildfire. Managed wildfires would serve the same purpose. While the projects noted above may have minor or short term possibilities to cumulatively combine with the trail system effects, these effects will either be offset by trail and road obliteration/naturalization (habitat creation/restoration) or will in time become positive habitat enhancements after Forest health treatments.

Determination of Effect

Based on the discussion above, I find that this alternative may impact individuals, but is not likely to result in a loss of viability or trend toward federal listing.

Alternative C

Direct and Indirect Effects

The effects for Alternative C are the same as in Alternative B. More trails would be created in this alternative, but the mileage in sensitive bat foraging habitat is the same, and will have no further effect on bats or the habitat of their prey specifically.

Cumulative Effects

Cumulative effects for Alternative C would be the same as those outlined for Alternative B.

Determination of Effect

Based on the discussion above, I find that this alternative may impact individuals but is not likely to result in a loss of viability or trend toward federal listing.

American Peregrine Falcon

American peregrine falcon (*Falco peregrinus anatum*) occurs across Arizona. Essential habitat includes rock cliffs for nesting and a large foraging area, with nesting site cliffs having a mean height of 200 to 300 feet, and is a permanent resident on the Coconino National Forest. Peregrines are aerial specialists, preying mainly on birds found in wetlands, riparian areas, meadows, parklands, croplands, mountain valleys and lakes within a 10-20 mile radius from the nest site.

EXISTING CONDITIONS

No known nest sites exist within the project area. Suitable nesting locations exist in James and Kelly Canyons on the west side of I-17, approximately 1 mile from the project area. The nearest known eyrie location is within the steep canyon portion of Pumphouse wash, at the north end of the Oak Creek Canyon complex, approximately 2 miles from the project area. Peregrines likely forage through the area. There are a few small meadows within the project that may provide foraging habitat.

Alternative A (No Action Alternative)

Direct and Indirect Effects

Under the no action alternative, motorized use of the area would continue. This use can be characterized by frequent to heavy use. Roads and trails identified through the Kelly Trails alternatives to be obliterated or naturalized would remain administratively closed only, slowing the regeneration of the native vegetation in these areas. This is not expected to have an effect on peregrine falcons or their prey.

Cumulative Effects

Under the No Action alternative there are no direct or indirect effects, therefore there are no cumulative effects.

Alternative B (Proposed Action)

Direct and Indirect Effects

Under Alternative B, the nearest known peregrine eyrie exists approximately 2 miles away, and there would be no anticipated nesting or breeding disturbance from this trail system. No trail segments occur near major water bodies that might impact waterfowl reproduction, an important prey species. No direct or indirect effects are anticipated.

Cumulative Effects

No direct or indirect effects are anticipated, therefore there are no cumulative effects.

Determination of Effect

Considering the above discussion, I find that this alternative will have no effect on peregrine falcons or cause a loss of viability or a trend towards federal listing.

Alternative C

Direct and Indirect Effects

Under Alternative C, the nearest known peregrine eyrie exists approximately 2 miles away, and there would be no anticipated nesting or breeding disturbance from this trail system. No trail segments occur near major water bodies that might impact waterfowl reproduction, an important prey species. No direct or indirect effects are anticipated.

Cumulative Effects

No direct or indirect effects are anticipated, therefore there are no cumulative effects.

Determination of Effect

Considering the above discussion, I find that this alternative will have no effect on peregrine falcons, and is not likely to result in a loss of viability or trend toward federal listing.

Bald Eagle

Bald eagles (*Haliaeetus leucocephalus*) occupy northern Arizona primarily as a winter resident or migrant. From 1995 through 2007, an average of 319 individuals has been counted during the annual midwinter survey in Arizona (Jacobsen et. al 2007). On the Forest, wintering eagles occupy most habitat types and elevations, but are most frequently seen within ponderosa pine, pinyon-juniper, and grassland habitats, often near water. Wintering eagles arrive in the fall, usually late October or early November, and leave in early to mid-April. The highest numbers of wintering eagles are counted on routes that include Lake Mary, Mormon Lake, and I-17. Additionally, one bald eagle breeding area occurs above the Mogollon Rim at Lower Lake Mary.

EXISTING CONDITIONS

No bald eagle roosts or nests have been identified within the project area. The only known breeding location on the District is approximately 5 miles to the north-east of the project area. However, one documented roost has been identified on the west side of I-17 on Ritter Mountain, approximately 1.75 miles from the proposed project area (P.K. Joshi, 2009). Additionally, 3 potential bald eagle roost sites identified through the Mortgage Multiproduct Timber Sale located on the west side of I-17 located near Kelly Seep (0.5 mi from project area), Mortgage tank (1.2 mi from project area), and just north of the west side of Munds Park (0.8 miles from project area). Due to the project's location near the I-17 corridor, it is possible that eagles forage adjacent to the area.

Alternative A (No Action Alternative)*Direct and Indirect Effects*

Under the no action alternative, there would be no direct or indirect effects on bald eagles or their prey.

Cumulative Effects

As there are no direct or indirect effects identified, there are no cumulative effects.

Alternative B (Proposed Action)*Direct and Indirect Effects*

Under Alternative B, no effects to the prey of bald eagles due to disturbance is expected due to the lack of any major water bodies in the project area that would support waterfowl or a sizeable

fish population, as well as the short duration typical of motorized use. Additionally, this trail system would likely be closed from mid-December to mid-April due to the Forest's Wet Weather Road Policy. This would prevent motorized use on the trail system during a large portion of the season when bald eagles visit the area, October 15 – April 15, which would minimize disturbance to any bald eagles that pass through or forage through the area, as well as any unidentified bald eagle winter roosts. There are currently no bald eagle roosts identified within the project boundary.

Construction of two parking areas and decommissioning of 14 miles of roads are expected to occur outside of October 15 – April 15 and thus would have no effect on the bald eagle.

Cumulative Effects

Other projects within the Kelly Trails boundary that could cumulatively combine with this project would include Fuels/Forest Health projects (such as 4FRI and the Munds Park/ Mountaineer Fuels Reduction projects) and recreation projects (such as Munds Park Motorized Trails and Mountaineer Community Trails). These projects also may have some disturbance to Bald Eagles foraging or flying through the area, though this is expected to seldom occur as the majority of these projects and their associated disturbance occur during the summer months, when eagles likely are not in the area.

Determination of Effect

Considering the above discussion, I find that this alternative would not result in any take of bald eagles, or cause a trend towards federal listing for bald eagles.

Alternative C

Direct and Indirect Effects

The effects under Alternative C are similar to Alternative B. The added mileage of trails could increase the possible disturbance to eagles, but again this disturbance is expected to be minimal considering the bald eagles use of the area through the winter months when this trail would likely see little use or be closed completely.

Cumulative Effects

The cumulative effects for Alternative C are similar to those identified in Alternative B, with the difference of having more miles of trail created. This would increase the possible disturbance to eagles that may be in the area, either flying through or foraging adjacent to the project area. These effects are not expected to amount to a change in the determination of the effects on eagles, especially considering the winter presence of eagles when these trails are likely closed.

Determination of Effect

Considering the above discussion, I find that this alternative would not cause a trend towards federal listing for bald eagles.

Four-spotted Skipperling, Nitocris Fritillary, and Nokomis Fritillary

Four-spotted Skipperling

The four-spotted skipperling (*Piruna polingii*) ranges throughout central and northern Arizona. The habitat of the spotted skipperling consists of moist meadows and streamsides in high elevation mountains. This species takes nectar along cool, deep canyons and along forested road margins. The species has been seen congregating on moist cliffsides. *Dactylis glomerata* (Poaceae) is a strongly suspected food source. The spotted skipperling is associated with mixed broadleaf deciduous and montane willow riparian forest, wetland cienega and montane subalpine grasslands.

EXISTING CONDITIONS

While no four-spotted skipperlings have been observed within the project area, potential habitat does exist within the project boundary. Cool, wet grasslands with springs and seeps would be the preferred habitat for this species. These conditions may exist in Pumphouse Wash, Kelly Canyon, or James Canyon.

Nitocris Fritillary

The Nitocris Fritillary (*Speyeria nokomis nitocris*) has been collected from Kehls Spring (Coconino County) and Clover Spring (Apache County) in Arizona, which are located on the Mogollon rim. Nitocris fritillaries are found only in alpine meadows, though it is thought that an extensive population of this subspecies flies above and below the Mogollon Rim. Their habitat includes mixed conifer, ponderosa pine, spruce fir, montane willow riparian forests and wetland cienega vegetation types.

EXISTING CONDITIONS

There are no recorded observations of Nitocris fritillaries within the project boundary, and no surveys have been done for this species. Ponderosa pine abounds within the project area. The wet streamside meadows and seepage areas that are important for this species may occur to some small degree within the Ponderosa pine, but largely are absent within the project area. Some locations nearby that may provide adequate habitat include Kelly Canyon, Pumphouse Wash, or James Canyon.

Nokomis Fritillary

The Nokomis fritillary (*Speyeria nokomis nokomis*) is found in streamside meadows and seepage areas with an abundance of viola, or forests with viola in the understory. They have been found in Apache, Coconino, Greenlee counties; San Francisco Peaks and White Mountain drainages; Oak Creek Canyon; and Alpine, White Mountains. They are associated with aspen and viola. Their habitat includes mixed conifer, ponderosa pine, spruce-fir and wetland cienega vegetation types.

EXISTING CONDITIONS

There are no known recorded observations of Nokomis fritillaries within the project boundary, and no surveys have been done for this species. Ponderosa pine abounds within the project area.

The wet streamside meadows and seepage areas that are important for this species may occur to some small degree within the ponderosa pine, but largely are absent. Some locations nearby that may provide adequate habitat include Kelly Canyon, Pumphouse Wash, or James Canyon.

Alternative A (No Action Alternative)

Direct and Indirect Effects

Under the no action alternative, current trends of motorized use would continue throughout the area. This use can be characterized by frequent to heavy motorized use, widely dispersed on open Forest Service roads. This use occurs mostly during the summer and fall. Fourteen miles of roads to be decommissioned through the Kelly Trails project would not occur, slowing the recovery of these areas. No direct or indirect effects are expected.

Cumulative Effects

Because there are no direct or indirect effects, there are no cumulative effects.

Alternative B (Proposed Action)

Direct and Indirect Effects

Under the proposed action 33 miles of new construction trail in Nokomis and Nitocris habitat in ponderosa pine areas would occur. This corresponds to 14 acres of habitat being removed. Also, 6.7 miles of new trail construction through Skipperling habitat in grasslands and moist riparian drainages would occur, corresponding to 4 acres of habitat removed. These acres are spread along a small trail over many miles, and are not a single block of habitat. These areas would continue to function as butterfly habitat with natural vegetation occurring surrounding the trail, though to a reduced degree of quality. It is expected that these trails would concentrate use upon them. These designated trails would avoid wet meadows, seeps, and springs and avoid impacts to feeding, breeding, or resting butterflies to a large extent. Some collisions may occur from flying butterflies dispersing through the area, but this would occur to the same degree or to a slightly less degree than happens currently with the ongoing use of the area for motorized recreation as these trails would be focusing use along a single trail, rather than dispersed throughout a wide area.

Planned trailheads would occur in the Ponderosa Pine habitat type. These two trailheads would remove 1.4 acres (.7 acres each) from potential Nokomis and Nitocris habitat. These areas would be blocks of habitat removed and would no longer function as feeding, roosting, or resting habitat for these species. This small amount of acreage removed is offset by the restoration of habitat from decommissioned roads and is expected to have little affect, and will not alter the effects determination.

Decommissioned roads would restore habitat for the species. A total of 14 miles of decommissioned roads are planned, approximately 1 mile of grassland habitat and 13 miles in the ponderosa pine habitat type. This corresponds to 3.1 acres and 32.3 acres restored respectively.

Cumulative Effects

Projects identified from the cumulative projects list that may occur in nokomis, nitocris, and skipperling butterfly habitat are Grazing (in the Windmill, Mud Springs, Casner Park/Kelly Seep allotments), Fuels and Forest Health Projects (Mountaineire and Munds Park Fuels Reduction projects), and Recreation projects (Mountaineire and Munds Park motorized trails) Grazing projects may combine with proposed project activities from the removal of vegetative forage for targeted forage plants. The rotation and rest system currently in use minimizes these forage reduction impacts to butterflies, and the combination discussed here is expected to be discountable. The Travel management rule is expected to reduce direct mortality across butterfly habitat by concentrating use on these roads and reducing widespread dispersed motorized use. Recreational projects may also combine their effects, but will not raise the disturbance levels or direct mortality rates much above that which occurs through the area with the high use levels. Fuel reduction and Forest health projects such as 4FRI and Mountaineire and Munds Park Fuels reduction will cause direct mortality from treatments and machinery and vegetative impacts in the short term, but will improve and protect butterfly habitat in the long term. These short term negative effects may combine with the degradation of butterfly habitat through trail creation, but is expected to be a small amount of habitat that is offset by road and trail decommissioning over the long-term.

Determination of Effect

Considering the above discussion, I find that this alternative would not cause a trend towards federal listing for Four Spotted Skipperling, Nitocris and Nokomis fritillary.

Alternative C

Direct and Indirect Effects

Under Alternative C, 45 miles of new construction trail in Nokomis and Nitocris in ponderosa pine habitat would occur. This corresponds to 28 acres of habitat being removed. Also, 6.7 miles of new trail construction through Skipperling habitat in grasslands habitat would occur, corresponding to 4 acres of habitat removed. These acres are spread along a small trail over many miles, and are not a single block of habitat. These areas would continue to function as butterfly habitat with natural vegetation occurring surrounding the trail, though to a smaller reduced degree of quality. It is expected that these trails would concentrate use upon them. These designated trails would avoid wet meadows, seeps, and springs and avoid impacts to feeding, breeding, or resting butterflies to a large extent. Some collisions may occur from flying butterflies dispersing through the area, but this would occur to the same degree or to a slightly less degree than happens currently with the ongoing use of the area for motorized recreation as these trails will be focusing use along a single trail, rather than dispersed throughout a wide area.

This alternative removes a slightly larger portion of butterfly habitat than Alternative B, thus having a slightly more negative impact than Alternative B. However, these trails would also serve in the same capacity by focusing use upon them and reducing dispersed use through the area.

Cumulative Effects

The cumulative effects for Alternative C will be similar to those in Alternative B, but will occur to a slightly larger degree. The magnitude of this change however is not expected to be large enough to alter the determination of effect.

Determination of Effect

Considering the above discussion, I find that this alternative may impact individuals, but will not result in a loss of viability or trend toward federal listing for nokomis and nitocris fritillaries, and four-spotted skipperling.

Management Indicator Species (MIS)

Of the sixteen MIS species identified on the Coconino National Forest, 7 have been identified to exist or have habitat within the project area based on Forest ERA habitat GIS data (A dominant overstory vegetation mapping layer). These are presented in the table 15 below. Effects to Northern goshawk are also analyzed in the Sensitive Species section of this report.

Table 15: Management Indicator Species (MIS) in the project area

Species	Indicator Habitat	Dominant Overstory Vegetation	Habitat Acres Removed / Forestwide Acres	
			Alternative B	Alternative C
Abert's Squirrel	Early seral Ponderosa Pine	Ponderosa Pine	38 Acres / 807,424 Acres	46 Acres / 807,424 Acres
Northern goshawk	Late seral Ponderosa Pine	Ponderosa Pine		
Pygmy nuthatch	Late seral Ponderosa Pine	Ponderosa Pine		
Turkey	Late seral Ponderosa Pine	Ponderosa Pine		
Elk	Early seral Ponderosa Pine	Ponderosa Pine		
Hairy woodpecker	Snag Component Ponderosa Pine	Ponderosa Pine		
Pronghorn	Early and late seral grasslands	Open Areas	0.37 Acres / 24,199 Acres	0.57 Acres / 24,199 Acres

Abert's Squirrel

EXISTING CONDITIONS

The Forest Plan designates the Abert's squirrel as a management indicator species for early seral stage ponderosa pine forests. However, Abert's squirrels use a variety of age classes and research from several locations has shown strong habitat associations with mature ponderosa pine. Recent research indicates that this species best habitat is the intermediate to older aged forest (trees 9-22 inches dbh), where groups of trees have crowns that are interlocking or in close proximity (Dodd et al. 1998).

Forest wide population trend

The Forest-wide population trend is currently inconclusive as there is little forest specific data. Abert's squirrels are found throughout the project area, and statewide information from hunting harvests indicates a stable trend for squirrels.

Forest-wide habitat trend, early seral stage ponderosa pine

The Forest –wide trend for early seral stage ponderosa pine is stable. The age class distribution has remained largely the same, with mid seral stands dominating. Early seral stage habitat is currently being created by wildfire.

Northern Goshawk**EXISTING CONDITIONS**

The Forest Plan designates this species a MIS for late seral stages of ponderosa pine forests. Goshawks are relatively abundant and widespread. Although population trends are difficult to determine, there is no hard evidence of a considerable decline overall, but populations could be declining in some areas (NatureServe 2007). There are currently 3 PFA's within the project boundary and a 0.3 mile buffer. See the Northern Goshawk section for a review of the status within these PFAs.

Forest-wide population trend

The Forest-wide population trend is inconclusive. Although the Forest has some information on territory occupancy and reproduction, these data are not designed to detect changes in population trend. The total number of territories has increased, and statewide BBS data indicate a significant increase, but some indicators of occupancy and productivity appear to be declining on the Forest. Monitoring and surveys are ongoing on the forest.

Forest-wide habitat trend, late seral stage ponderosa pine

The Forest-wide habitat trend for late-seral ponderosa pine has declined. This is likely due to a number of factors from timber harvest to illegal fuel wood collection, fire suppression activities, and wildfire. The age class distribution of ponderosa pine has remained essentially the same, dominated by mid-seral stage, with some loss of old-growth and older trees, and some early seral stage habitat created by wildfire.

Pygmy Nuthatch**EXISTING CONDITIONS**

The Forest Plan designates the Pygmy nuthatch a MIS for late seral stage ponderosa pine forests. The pygmy nuthatch is generally associated with mature ponderosa pine forests, where it prefers open, park-like stands of old, yellow pines. It is also found in dense pine forests, as long as large trees and snags are present. The pygmy nuthatch is also tied to old, large oak trees and cavities. This nuthatch requires dead trees or dead-top trees where it builds nests in cavities. Both in Arizona and North America, moderate threats exist on breeding and wintering grounds.

Populations are thought to be stable on the Coconino National Forest and statewide. Ponderosa pine snags, a key component for this species, are currently increasing and model projections suggest that, at least in the short term, snag numbers will continue to increase and densities of large snags will increase. Despite the increases, densities of large snags, greater than 18 inches diameter at breast height (dbh), would remain below Forest Plan guidelines (Ganey and Voijta 2007).

Forest-wide population trend

The Forest-wide trend is stable, although there are dramatic population fluctuations in the short-term, and small, local populations, such as those in snowmelt drainages, may be temporarily extirpated (Ffolliatt and Gottfried 2010).

Forest-wide habitat trend, late seral stage ponderosa pine

The age class distribution of ponderosa pine has remained essentially the same, dominated by mid-seral stage, with some loss of old-growth and older trees, and some early-seral stage habitat created by wildfire. Overall snags in the ponderosa pine type on the Forest are currently increasing and model projections suggest that, at least in the short term, snag numbers will continue to increase and densities of large snags will increase. Despite the increases, densities of large snags, greater than 18 inches dbh, would remain below Forest Plan guidelines (Ganey and Voijta 2007).

Turkey

EXISTING CONDITIONS

The Forest Plan designates turkey as a MIS for late seral stage ponderosa pine forests, based on roost habitat requirements. Although the age class distribution of ponderosa pine has remained dominated by mid-seral stage stands, there had been some loss of old growth and older trees, resulting in a decline in forest-wide habitat trend for late seral ponderosa pine habitat. Turkey roosts and nesting habitat occur in steep drainages and on hills. Turkey populations on the CNF declined in the early 1990s and have increased since the mid 1990s in probable response to favorable overwintering conditions changes in hunt design and GMU management, and contributions to overall mast production from trees from the 1919 seed year. The age class distribution of ponderosa pine has remained the same during Forest Plan implementation. Late seral stage trees have remained largely unchanged on slopes greater than 40 percent, except in areas burned by high intensity wildfire, such as the Schultz fire of 2010. The loss of large old trees occurred on slopes less than 40 percent during the early stages of Forest Plan implementation. The rate of loss due to timber harvest is now much reduced and harvest of trees over 24 inches dbh rarely occurs. Other factors affecting turkey populations are lack of cover in key areas (including travel corridors), water availability, and forage availability are important factors (USDA 2002).

Forest-wide population trend

The Forest-wide population trend is increasing. The trend was variable in the early part of the Plan implementation period (late '80s and early '90s), although AGFD standard procedures did not provide good data due to low number of observations along survey routes. AGFD developed a

better index of turkey populations in the mid 1990s. Data from 1997-2001 indicate a modestly increasing trend. For the last five years, GMU 7 shows a relatively stable trend, with all other GMUs showing a general increasing trend for both percent of archery elk hunters seeing turkeys and the number of turkeys seen per day (USDA 2002).

Forest-wide habitat trend, late seral ponderosa pine

The age class distribution of ponderosa pine has remained essentially the same, dominated by mid-seral stage stands, with some loss of old-growth and older trees, and some early seral stage habitat created by wildfire.

Elk

EXISTING CONDITIONS

Elk is an indicator of early seral stages of ponderosa pine, mixed conifer, and spruce-fir forests. Overall, elk are considered to be stable statewide and stable on the Coconino National Forest (USDA Forest Service 2002). Productivity tends to be high and herds are located in all habitat types. The objective of the Arizona Game and Fish Department is to maintain elk populations at levels that provide maximum and diverse recreational opportunities, while avoiding adverse impacts to the species and its habitat while minimizing land use conflicts.

Forest-wide population trend

The Forest-wide trend is stable. Elk numbers on the Forest increased in the early to mid-1990s, with a gradual decline through 2001 to roughly the 1980s level.

Forest-wide habitat trend; early seral ponderosa pine

The forest wide trend is stable for ponderosa pine. The age class distribution of ponderosa pine has remained essentially the same, dominated by mid-seral stage stands, with some loss of old growth and older trees, and some early seral stage habitat created by wildfire. Early seral-stage ponderosa pine has not increased to any large degree.

Hairy Woodpecker

EXISTING CONDITIONS

This species is an indicator of snags in ponderosa pine, mixed conifer, and spruce-fir forests for suitable nesting and feeding habitat. Hairy woodpeckers are most abundant in mature forests with large old trees suitable for cavity nesting and are also common in medium-aged forests. Hairy woodpeckers prefer forests with dense canopies (Bushman and Therres 1988). They use tree cavities for roosting and winter cover and may excavate new cavities in fall to be used for roosting (Souza 1987). This species is experiencing loss of suitable breeding habitat in the form of snags, both range-wide and in Arizona. According to Latta et al. (1999), hairy woodpeckers are uncommon throughout their range yet common in their preferred habitat in Arizona.

Forest-wide population trend

The Forest-wide trend is stable, or slightly increasing. Minor population decreases occur on a short-term scale of 1-3 years, but are generally followed by a recovery (Coconino National Forest 2002).

Forest-wide habitat trend; snag component of ponderosa pine

In 2002 the Forest estimated that trends for snags in ponderosa pine habitats were probably declining (Coconino National Forest 2002). However, a study by Ganey and Vojta (2007) conducted on the Coconino suggest that within ponderosa pine and mixed conifer habitats, model projections suggest that, at least in the short term, snag numbers will continue to increase and densities of large snags will increase. Despite these increases, densities of large snags, greater than 18 inches dbh, would remain below Forest Plan guidelines.

Abert's Squirrel, Goshawk, Pygmy Nuthatch, Turkey, Elk and Hairy Woodpecker – Ponderosa Pine and Snags Indicator Habitat.

Alternative A (No Action Alternative)

Direct and Indirect Effects

Under the no action alternative, roads and trails planned through the Kelly Trails project would not be decommissioned. These areas will in time recover without this work, but much more slowly.

Cumulative Effects

Because there are no direct or indirect effects, there are no cumulative effects.

Alternative B (Proposed Action)

Direct and Indirect Effects

Under Alternative B, 73 miles of trail would be designated in ponderosa pine habitat type. Also, 13.33 miles of roads would be decommissioned in the ponderosa pine habitat type. Cutting of trees for trail creation would avoid ponderosa pine 9 inches dbh or greater, and 5 inches at the root collar or greater for oak as much as possible. The quantity of habitat would remain roughly equivalent. The disturbance from motorized use would be concentrated on this designated trail system. Large snags would be avoided where possible. These changes are not expected to be large enough to cause a change in the Forest wide population or habitat trends for these species.

2 planned trailheads would remove 1.4 acres of habitat (.7 acres each). These small acreages are offset by road decommissioning in the habitat type.

Cumulative Effects

Projects identified from the cumulative projects list that may occur in ponderosa pine habitat are Grazing (in the Windmill, Mud Springs, Casner Park/Kelly Seep allotments), Fuels and Forest Health Projects (Mountaineer and Munds Park Fuels Reduction projects, 4FRI), and Recreation projects (Mountaineer and Munds Park motorized trails). Grazing projects may combine with proposed project activities from the removal of vegetative forage for forage and prey species.

Fuels and forest health projects may have short term disturbance associated with treatments, but are expected to provide long term benefit to ponderosa pine habitat by increasing forest health and reducing the possibility of catastrophic wildfire. Recreational projects may increase disturbance in the areas of trail creation, but are expected to reduce noise and visual disturbance throughout the rest of ponderosa pine habitat by concentrating use on these systems and reducing widespread dispersed motorized use.

Determination of Effect

No effect to the current forest-wide trend.

Alternative C

Direct and Indirect Effects

Under Alternative C, 93.53 miles of trail would be designated in ponderosa pine type. Also, 13.33 miles of roads would be obliterated in the ponderosa pine habitat type. Cutting of trees for trail creation would avoid ponderosa pine 9 inches dbh or greater, and 5 inches at the root collar or greater for oak. The quantity of habitat would remain roughly equivalent. The disturbance from motorized use would be concentrated on this designated trail system. Large snags would also be avoided where possible. This alternative designates more miles of trails than alternative B, and could produce more disturbances in these additional areas.

2 planned trailheads would remove 1.4 acres of habitat (.7 acres each). These small acreages are offset by road decommissioning in the habitat type. Decommissioned roads and road to trail conversions will result in a net increase in habitat over time.

These changes are not expected to be large enough to cause a change in the Forest wide population or habitat trends for these species.

Cumulative Effects

The cumulative effects for Alternative C would be the same as those in Alternative B, but to a slightly larger degree due to the extra mileage associated with this alternative.

Determination of Effect

No effect to the current forest-wide trend.

Pronghorn Antelope

EXISTING CONDITIONS

Pronghorn antelope is a management indicator species for early and late seral grassland type. Much of these habitat types are in an impaired condition (USDA Forest Service, 2011). OHV travel has been observed in montane meadows and poses the greatest threat to soil, vegetation and wildlife. Pronghorn are sensitive to these disturbances, especially during calving season in the early summer.

Forest-wide population trend

The Forest wide population trend is declining. Declining numbers of animals observed and fawn to doe ratios below a breakeven of 20-35 fawns per 100 does is documented for all GMUs on the Forest except GMU 7.

Forest-wide habitat trend; early and late seral grasslands

Habitat trend is stable to declining. Although the total amount of grassland habitat has generally remained stable, habitat quality is stable to declining due to tree encroachment, fire suppression, long-term climatic changes, short-term drought, and ungulate grazing.

Pronghorn Antelope – Grassland Indicator Habitat**Alternative A (No Action Alternative)***Direct and Indirect Effects*

Under the no action alternative, current motorized use trends would continue throughout the area. This use can be characterized by frequent to heavy use on forest system roads. Approximately 1.28 miles of roads in pronghorn habitat planned to be decommissioned would remain administratively closed only, slowing the recovery of this area. There are no direct or indirect effects expected.

Cumulative Effects

As no direct or indirect effects are expected, there are no cumulative effects.

Alternative B (Proposed Action)*Direct and Indirect Effects*

Under Alternative B, 1.42 miles of trail would be designated in grassland habitat types. Also, 1.28 miles of roads would be obliterated in the grassland habitat type. The quantity of habitat would remain roughly equivalent. The disturbance from motorized use would be concentrated on this designated trail system. The quantity of habitat removed is slightly more than the amount returned to a natural state through decommissioning of roads. The disturbance from motorized use would be reduced from many areas currently accessed with user trails or off road use, and concentrated on this designated trail system. This would be a positive change for this species in the quality of the habitat. Neither of the proposed trailheads or parking areas are within Pronghorn habitat. Road decommissioning would restore 1.28 miles of habitat, offsetting the trail designation.

These changes are not expected to be large enough to cause a change in the Forest wide population or habitat trends for these species.

Cumulative Effects

Projects identified from the cumulative projects list that may occur in pronghorn habitat is Grazing (Windmill, Mud Spring, Casner Park/Kelly Seep allotments), and Recreation projects. Grazing projects may combine with proposed project activities from the removal of vegetative forage foraging pronghorn. The current rest and rotation system in place minimizes impacts associated from the loss of forage. These impacts may combine with the removal of pronghorn habitat associated with trail creation, although much of this mileage is offset by road and trail obliteration and naturalization. The impacts are expected to be small.

Determination of Effect

No effect to the current forest wide trend.

Alternative C*Direct and Indirect Effects*

Under Alternative C, 2.32 miles of trail would be designated in grassland habitat types. Also, 1.28 miles of roads would be obliterated in the grassland habitat type. The quantity of habitat removed is slightly more than the amount returned to a natural state through decommissioning of roads. The disturbance from motorized use would be reduced from many areas currently accessed with user trails or off road use, and concentrated on this designated trail system. This would be a positive change for this species in the quality of the habitat. Neither of the proposed trailheads or parking areas are within Pronghorn habitat. Road decommissioning would restore 1.28 miles of habitat, offsetting the trail designation.

These changes are not expected to be large enough to cause a change in the Forest wide population or habitat trends for these species.

Cumulative Effects

The cumulative effects for Alternative C would be the roughly the same as those for Alternative B.

Determination of Effect

No effect to the forest-wide trend.

Migratory Birds

Migratory birds considered for this analysis were birds identified as priority species in the Arizona Partners in Flight Bird Conservation Plan (Latta, et al. 1999) (APIF Plan) and birds in Bird Conservation Regions 34 and 16 of U.S. Fish and Wildlife Service's 2008 Birds of Conservation Concern (BCC) (USDI 2008b).

There are two Important Bird Areas (IBAs) on the Coconino National Forest, Anderson Mesa and Lower Oak Creek Canyon, 6 miles and 3 miles distant, respectively. These are outside of the project area, and will not be analyzed further.

Table 16: Migratory Birds

Species	Habitat	ERA Overstory Vegetation Type	Habitat Acres Removed / Forestwide Acres	
			Alternative B	Alternative C
Cordilleran Flycatcher	Ponderosa Pine	Ponderosa Pine	38 Acres / 807,424 Acres	46 Acres / 807,424 Acres
Oliver Warbler	Ponderosa Pine	Ponderosa Pine		
Greater Pewee	Ponderosa Pine	Ponderosa Pine		
Grace's Warbler	Ponderosa Pine	Ponderosa Pine		
Lewis' Warbler	Ponderosa Pine	Ponderosa Pine		
Flammulated Owl	Ponderosa Pine	Ponderosa Pine		
Purple Martin	Ponderosa Pine	Ponderosa Pine	0.37 Acres / 24,199 Acres	0.57 Acres / 24,199 Acres
Swainson's Hawk	High Elevation Grassland	Open Areas		
Grasshopper Sparrow	High Elevation Grassland	Open Areas		

Direct, Indirect, and Cumulative effects

Cumulative effects for all Alternatives

Projects identified from the cumulative projects list that may occur in ponderosa pine migratory bird habitat are Grazing, Fuels and Forest Health Projects, Wildfires, and Recreation projects. Grazing projects may combine with proposed project activities from the removal of vegetative forage for insects, an important prey species. Fuels and forest health projects may have short term disturbance associated with treatments, but are expected to provide long term benefit to migratory bird habitat by increasing forest health and reducing the possibility of catastrophic wildfire. The Travel Management Rule is expected to reduce noise and visual disturbance throughout the rest of migratory bird habitat by concentrating use on these systems and reducing widespread dispersed motorized use.

Alternative A (No Action Alternative)

Under the no action alternative, current use trends for the area would continue. This use can be characterized by frequent to heavy motorized use during the summer and fall. This dispersed use can impact breeding birds from the noise and visual disturbance associated with motorized use.

Alternative B (Proposed Action)

Under Alternative B, approximately 71 miles of trail would be designated in ponderosa pine type, and 1.42 miles of trail in high elevation grasslands. Additionally, there would be 1.28 miles of obliterated roads within high elevation grasslands, and 13.33 miles of obliterated roads within the ponderosa pine habitat type. Cutting of trees for trail creation would avoid ponderosa pine 9 inches dbh or greater, and 5 inches at the root collar or greater for oak. The quantity of habitat would remain roughly equivalent. The disturbance from motorized use would be concentrated on

this designated trail system. This would be a positive change for migratory birds. Large snags would also be avoided. Direct harm and mortality is not likely to occur from tree cutting, as it is limited to smaller trees, or collisions. Roads decommissioned in the ponderosa pine habitat type would restore habitat. The proposed trailheads would remove 1.4 acres (.7 acres each) of habitat. These amounts of acreages are not expected to have a large impact on migratory birds.

Determination of effect

Direct harm or mortality to migratory birds is not likely to occur.

Alternative C

Under Alternative C, 93.53 miles of trail would be designated in ponderosa pine type, and 2.32 miles of trail in high elevation grasslands. Additionally, there would be 1.28 miles of obliterated roads within high elevation grasslands, and 13.33 miles of obliterated roads within the ponderosa pine habitat type. Cutting of trees for trail creation would avoid ponderosa pine 9 inches dbh or greater, and 5 inches at the root collar or greater for oak. The quantity of habitat would remain roughly equivalent. The disturbance from motorized use would be concentrated on this designated trail system. This would be a positive change for migratory birds. Large snags would also be avoided. Direct harm and mortality is not likely to occur from tree cutting, as it is limited to smaller trees, or collisions. Roads decommissioned in the ponderosa pine habitat type would restore habitat. The planned trailheads would remove 1.4 acres (.7 acres each) of habitat. These amounts of acreages are not expected to have a large impact on migratory birds.

This alternative designates more miles of trails than alternative B, and could produce more disturbances in these additional areas.

Determination of effect

Direct harm or mortality to migratory birds is not likely to occur.

Heritage

This section describes the affected environment and environmental consequences for the Heritage resource within the analysis area.

Methodology for Analysis

The heritage evaluation is based on field work and record searches from numerous previous projects conducted between 1970 and 2011. Additionally, recent field work was completed for this project by Purcell in 2011 (Coconino Report 2011-23-A). The project area is considered to be of low archaeological site density per the Coconino National Forest (COF) site density models.

The project area consists of approximately 96 linear miles at a maximum width of 15ft, or 175 acres of forest land. In addition, two new trail heads that total approximately (30,000 square foot each) 1.5 acres are proposed. Total proposed project size is approximately 176 acres. Approximately 58 acres or 33% of the project area has been surveyed for heritage resources. Due to funding sources and availability, this project will be implemented in phases. As areas are identified, archaeological inventories will be conducted to ensure all routes are surveyed prior to

implementation. All archaeological resources will be avoided by project activities and will result in a no effect to the resource.

The following Native American groups were consulted on the project in the Proposed Action dated November 28, 2011: Hopi Tribe, Tonto Apache Tribe, Yavapai-Apache Nation, Yavapai-Prescott Tribe, and White Mountain Apache Tribe. This proposal was introduced to the Hopi at an August 17, 2011 administrative meeting regarding the Schedule of Proposed Actions. The Hopi Tribe claims cultural affiliation to prehistoric cultural groups on the Coconino National Forest. The Hopi Cultural Preservation Office supports the identification and avoidance of prehistoric archaeological sites and considers the prehistoric archaeological sites of their ancestors to be “footprints” and Traditional Cultural Properties. The Hopi has requested copies of the cultural resource surveys of the areas of potential effect for review and comment as each phase of the project is inventoried in order to determine if the project might affect cultural resources significant to them (letter from the Hopi dated December 5, 2011). There have been no other replies regarding Hopi concerns and consultation will continue for the duration of the project. No other replies regarding tribal concerns were received.

EXISTING CONDITIONS

There are 14 historical properties identified within 100 meters of the proposed trail corridors. These sites reflect the long history of human occupation and use of the area from early Archaic hunter gatherer activities through the Sinagua period and culminating with mid 20th century sites from Euro and Native American use and settlement of the area.

Of the 14 previously recorded archaeological sites four are prehistoric and ten are historic.

At this time, all 14 sites have some element that can potentially lead to further research and understanding of past human use of the area.

The earliest prehistoric sites date from the early to middle Archaic periods. Within the project area can be found evidence of 6 of these site types, probably hunting/gathering activities from 2,000 to 4,000 thousand years ago.

Following early uses by Archaic peoples, the Sinagua settled the area around 500-600 CE. Their typical site types, artifact scatters and pit houses are reflected within the project boundaries through sites dating to the Rio de Flag phase (960-1067 CE).

The earliest known historic use of the project area began with the U.S. army and culminates with the settlement and resource extraction activities of logging, ranching, homesteading and still later, tourism, into the middle part of the 20th century.

Army and pioneer activities were followed by economic interests in the 1870s-80s with railroad and ranching with the lumber industry leading the way. Examples of these historic activities found in the project area are the remains of the Saginaw and Manistee, Clark Valley, Munds Park/Howard Spring and the Clark Valley to Howard Mountain logging railroad lines and three log cabins dating to the early 20th century.

Examples of Site Types found in and around the Kelly Motorized Trail Project

Prehistoric:	Non diagnostic lithic scatters	3
	Caveate	1
Historic:	Clark Valley Logging Railroad (RR)	1
	Clark Valley to Howard Mt. RR	1
	Munds Park/Howard Spring RR	1
	Saginaw Manistee Logging RR	1
	Camps and Trash dumps	3
	Cabins	3

All existing sites in the project area have the potential to increase the knowledge of human activities through various lines of research as well as assist in the interpretation of past human activities on the historic use of the Kelly Motorized Trail project area to the public.

Until all proposed trails have been surveyed and all sites inventoried the impacts of decades of unmanaged, cross-county travel are not clear. The Travel Management Rule (TMR) decision (September 2011) changed the motorized travel policy of the Coconino National Forest from one that was essentially “open unless posted closed” to “closed to unrestricted motorized cross-country vehicle travel unless specifically designated as open.” While the post-TMR decision policy is considered as part of the existing condition for this report, implementation of these restrictions began fairly recently on May 1, 2012. Because of this recent implementation, incidental use of non-system trails and roads is anticipated to continue over the short-term (1-3 years) while Forest visitors adjust to the new motorized travel system and policy, and while the Forest works to improve signage and decommission closed roads through additional NEPA analysis.

ENVIRONMENTAL CONSEQUENCES

Alternative 1 (No Action Alternative)*Direct and Indirect Effects*

The no action alternative would result in no ground disturbance, and thus result in no effect.

Cumulative Effects

Since there are no Direct or Indirect Effects, there are no cumulative effects.

Alternative B (Proposed Action)*Direct and Indirect Effects*

Proposed trails, trail heads, and road decommission locations would all be analyzed for effects to archaeological resources. Project specific inventories for 73 miles of trails would be conducted to ensure all known cultural resources are avoided and any effects to these resources mitigated. Managing use on designated system trails, open roads and identified trailheads tends to minimize the damage and degradation of cultural resources.

Cumulative Effects

This action would help in the implementation and/or enforcement of TMR by providing legal opportunities for motorized trail recreation and by decommissioning non-system roads and trails, thus decreasing the likelihood of unmanaged/unauthorized cross-country travel.

Decommissioning roads and closing unauthorized trails would limit access to cultural resources and as a result, over time may be considered a beneficial effect to maintaining the integrity of the resource (ie. National Register eligibility).

Alternative C*Direct and Indirect Effects*

Effects would be the same as Alternative B; however, an additional 23 miles (for a total of 96 miles) of trails would be inventoried for cultural resources.

Cumulative Effects

Effects would be the same as Alternative B.

Botany

This section describes the direct, indirect, and cumulative effects of implementing each alternative and consequences for Noxious or Invasive weeds and Region 3 Sensitive Plant Species and Threatened and Endangered species (TES) habitat in the project area. It presents the scientific and analytical basis for the comparison of the alternatives presented in Alternatives section.

Methodology

On the ground assessment was conducted in April, 2012, of the habitat for Noxious and Invasive weed species, and Region 3 Sensitive Plant species. Survey and GPS of routes will be conducted upon designation of routes and implementation of project. Sources for this analysis are various survey records and data on file at the Coconino National Forest. These include:

- TES plant data and noxious or invasive weed data stored in the NRIS/ TESP database- Invasive species application, a national application for data management for Threatened, Endangered and Sensitive plant and invasive species data
- GIS data for existing habitat and known occurrences
- Botany Specialist Report for Travel Management Rule (TMR), Crisp, Debra 2008
- Botany Specialist Report TMR Environmental Impact Statement Revision 2010
- Field assessment of suitable habitat April 3 and April 4, 2012 (Terri Walsh)

EXISTING CONDITIONS

The vegetation of the proposed project area is primarily ponderosa pine savannah with grassland understory. Ponderosa pine (*Pinus ponderosa*) density increases on steep rocky slopes with gambel oak (*Quercus gambelii*) common in the basalt dominated areas and particularly rocky drainages. Alligator juniper (*Juniperus deppeana*) and Rocky Mountain juniper (*Juniperus*

scopulorum) contribute minor tree cover throughout. Rich grassland understory is common dominated by Arizona fescue (*Festuca Arizonica*), prairie junegrass (*Koeleria macrantha*) and bluegrass (*Poa spp.*) The broad clayey parks increase substantially in Kentucky bluegrass.

The proposed system falls within multiple management areas encompassing approximately 68 square miles (43,800 acres). This discussion includes management actions related to noxious or invasive weeds since 1995. Prior to 1995, occurrences and distribution of noxious or invasive weeds on the forest were largely unknown. Beginning in 1995, the Coconino National Forest began surveying and documenting noxious or invasive weed occurrences on the forest. These actions were largely due to an increasing awareness of noxious or invasive weeds and their potential effects on native ecosystems. Location data were submitted to the Southwestern Exotic Plant Mapping Program (SWEMP), a cooperative effort hosted by the USGS Colorado Field Station. SWEMP compiled data from numerous cooperating agencies including the US Forest Service and Arizona Department of Transportation. The surveys by these agencies as well as other cooperators helped document the occurrences and areal extent of noxious or invasive weeds on the Coconino National Forest. Noxious or invasive weed data from the Forest were submitted to SWEMP from 1995 through 2003, when the Forest replaced the SWEMP system with its own Natural Resource Information System (NRIS) Threatened, Endangered and Sensitive Plants (TESP)-Invasive Species (TESP/INPA) database (Crisp, 2011).

The Forest developed the *Noxious Weeds Strategic Plan Working Guidelines Coconino, Kaibab and Prescott National Forests* in 1998 to help address and mitigate effects to noxious or invasive weeds by management actions on the forests. Forest Supervisors for the three forests accepted and signed the guidelines which designated a series of best management practices to be incorporated into project planning and implementation on the forests. In 2002, *the Peaks and Mormon Lake Ranger Districts completed the Flagstaff/Lake Mary Ecosystem Analysis (FLEA)*, a major landscape analysis. Among other issues, it addressed noxious or invasive weeds in certain management areas with the FLEA analysis area, incorporating the guidance provided by the Strategic Plan. In 2003, Region 3 of the U.S. Forest Service completed the Environmental Assessment for Management of Noxious Weeds and Hazardous Vegetation on Public Roads on National Forest System Lands in Arizona which allows treatment of noxious or invasive weeds along highway rights of ways in Region 3, including the Coconino National Forest (Crisp, 2011).

In 2005, the Forest completed the *Final Environmental Impact Statement for Integrated Treatment of Noxious or Invasive Weeds, Coconino, Kaibab, and Prescott National Forests within Coconino, Gila, Mojave, and Yavapai Counties, Arizona (FEIS)*. This document represented a major change in management of noxious or invasive weed control on the forests by allowing the use of herbicides on forest lands, therefore providing a management tool not previously available to forest managers. The document and its provisions were incorporated into the Coconino National Forest Plan by Amendment 20 of the Plan.

Noxious or Invasive Weeds

The following noxious or invasive weed species are known to occur within the project area and are listed in Table 17:

Diffuse knapweed (*Centaurea diffusa*)

Diffuse knapweed is an annual to short-lived perennial, growing one to two feet tall. Diffuse knapweed invades disturbed areas and can become an aggressive competitor, eliminating desirable vegetation (Whitson and others, 1991). There are numerous populations of this species in and around the Flagstaff area including areas within the Kelly Motorized Trails project area. Past control efforts for this species on the Forest include manual, herbicide and biological control agents.

Dalmatian toadflax (*Linaria dalmatica*)

Dalmatian toadflax is an introduced perennial weed that can grow up to 3 feet tall and reproduces from both seed and underground rootstalks. A single plant is capable of producing 500,000 seeds per season. The species is native to the Mediterranean region and was introduced to the United States as an ornamental. It forms dense stands eliminating native species by out-competing them for water. Often stands of Dalmatian toadflax will disappear for several years, only to re-establish through the seed bank or possibly vegetative root buds. Dalmatian toadflax is widely dispersed throughout the ponderosa pine type on the forest and is spreading along roadsides into pinyon-juniper and lower elevation ecosystems.

Table 17: Noxious and Invasive weed occurrences in the project area

Common Name	Species	Species Rank	Objective	Documented in analysis area
Diffuse knapweed	<i>Centaurea diffusa</i>	9	Contain/Control	YES
Dalmatian toadflax	<i>Linaria dalmatica</i>	18	Contain/Control	YES

ENVIRONMENTAL CONSEQUENCES

Alternative A (No Action Alternative)

Under the No Action alternative, current management plans would continue to guide the management of the project area. No motorized trails would be constructed, existing non-system routes would not be decommissioned, and no roads would be converted to trails. Two trailheads would not be constructed. In addition, no roads closed under the TMR decision would be proposed for decommissioning. The project area would continue to provide motorized recreation on the open forest road systems, which includes 40 miles of road Open to Highway Legal Vehicles Only, 89 miles of road Open to All Vehicles, and 9 miles of trail Open to Vehicles 50” or Less in Width.

Direct and Indirect Effects

If the No Action Alternative is selected, no motorized trails would be constructed, existing non-system routes would not be decommissioned, and no roads would be converted to trails. Two trailheads would not be constructed. In addition, no roads closed under the TMR decision would be proposed for decommissioning. As a result, there would be no risk of disturbance from these

actions that would lead to an increased risk in noxious or invasive weed invasion. However, mitigations such as weed control actions that would be included in the action alternatives would not occur.

Cumulative Effects

Since there are no direct/indirect effects, then there are no cumulative effects.

Alternative B and C

This discussion applies to Alternatives B and C as discussed in the Summary of Alternatives. The effects to noxious or invasive weeds are similar for both alternatives, and are analyzed accordingly.

Direct and Indirect Effects

Direct effects from motorized vehicles to plant communities in general include soil compaction, erosion or loss of top soil, crushing of above ground portions, crushing of roots, up-rooting of plants (Wilshire et al, 1978), compaction of native vegetation (Gelbard and Belnap, 2003) and altering habitats, stressing or reducing native vegetation, by providing avenues for conduction of weed infestations (Trombulak and Frissell, 2000) and by channeling or creating disturbance (Parendes and Jones, 2000). Roads and trail routes can contribute to forest fragmentation increasing the ratio of non-forested areas to forest and increasing the ratio of forest edge to interior habitats (Brothers and Spingarn, 1992; Fowler et al, 2008). These changes create open, disturbed environments, which in turn can provide habitat for noxious or invasive weeds (Brothers and Spingarn, 1992). Interior habitats can provide important refugia with fewer human generated disturbances for native plant species (Gelbard and Harrison, 2003).

Alternative B and C have a combined total of 78 miles of new construction for routes within Noxious and Invasive weed habitat. New trail construction within alternate B is less than 1 acre. New trail construction within Alternative C is approximately 26 acres (see Table 19). There are 25.56 combined acres of *Dalmatian toadflax* dispersed among these proposed areas for motorcycle and OHV trails. These occur in sensitive plant habitat of ponderosa pine and roadsides into pinyon-juniper and construction activities would potentially pose direct and indirect threat to the native plant community. Effects from new trail construction disturbance in Sensitive plant habitat would result in greater risk than other activities such as adopting unauthorized trails, road to trail conversion, and road decommissioning.

Both action alternatives propose decommissioning approximately 14 miles of closed routes. Effects common in the reduction of density of roads is the potential reduction in the number of vehicles in an area, which reduces the spread of invasive or noxious weeds. Decommissioned roads, as proposed in alternatives B and C, would have direct and indirect effects on sensitive plant habitat. Both Alternative B and Alternative C carry a high risk of weed spread and weed introduction into Sensitive plant occurrences and habitat, as both propose a combined total of 96 miles of management actions that would include disturbances of existing routes within construction or decommissioning activities. This would potentially cause a direct and indirect effect by vehicle vectors from construction and ground disturbing activity, but would be mitigated with the use of weed BMP's.

If alternative B or C is implemented, the number of Forest trails would be increased by adding routes and adopting unauthorized trails. Alternative C would likely result in greater likelihood of spreading noxious or invasive weeds because it includes more miles of routes. Existing conditions of unauthorized trails may have already contributed to the levels of noxious or invasive weeds. New routes would be surveyed before implementation of the project as part of the design features for both alternatives.

Interstate 17 has Dalmatian toadflax established along the entire corridor and there is concern for the potential of the invasive weed to spread during the construction of the proposed trailhead location off of Forest Road 700H, near the Kelly Canyon Interchange. Additionally, this area contains habitat for the Flagstaff pennyroyal, and there is an occurrence along Forest Road 703. This concerns is addressed through mitigation measures that require any heavy equipment get washed before accessing the site and thus there will be few effects from the construction, but potential likelihood of invasive species introductions and spread as the area gets use from Forest visitors.

Given the mitigation measures, both alternatives are expected to result in some increase in invasive species plant establishments and spread, but would be mitigated with the use of weed design features.

Table 18: Alternative B - Invasive Weed Occurrences within 200' of routes

<i>Design Feature</i>	<i>Need Condition</i>	<i>Invasive Common Name</i>	<i>Acres</i>	<i>TES plants</i>
<i>atv</i>	<i>closed road</i>	<i>Dalmatian toadflax</i>	<i>0.10</i>	<i>NO</i>
<i>atv</i>	<i>closed road</i>	<i>Diffuse knapweed</i>	<i>4.91</i>	<i>NO</i>
<i>atv</i>	<i>open road</i>	<i>Dalmatian toadflax</i>	<i>0.01</i>	<i>NO</i>
<i>motorcycle</i>	<i>new construction</i>	<i>Dalmatian toadflax</i>	<i>0.46</i>	<i>NO</i>
<i>motorcycle</i>	<i>road to trail</i>	<i>Dalmation toadflax</i>	<i>0.10</i>	<i>NO</i>
<i>motorcycle</i>	<i>user trail</i>	<i>Dalmation toadflax</i>	<i>0.30</i>	<i>NO</i>

Table 19: Alternative C - Invasive Weed Occurrences within 200' of routes

<i>Design Feature</i>	<i>Need Condition</i>	<i>Invasive Common Name</i>	<i>Acres</i>	<i>TES plants</i>
<i>atv</i>	<i>closed road</i>	<i>Dalmatian toadflax</i>	<i>0.10</i>	<i>NO</i>
<i>atv</i>	<i>closed road</i>	<i>diffuse knapweed</i>	<i>4.91</i>	<i>NO</i>
<i>atv</i>	<i>open road</i>	<i>Dalmatian toadflax</i>	<i>0.01</i>	<i>NO</i>
<i>motorcycle</i>	<i>new construction</i>	<i>Dalmatian toadflax</i>	<i>25.56</i>	<i>NO</i>

<i>motorcycle</i>	<i>new construction</i>	<i>diffuse knapweed</i>	<i>0.03</i>	<i>NO</i>
<i>motorcycle</i>	<i>open road</i>	<i>Dalmation toadflax</i>	<i>0.30</i>	<i>NO</i>
<i>motorcycle</i>	<i>road to trail</i>	<i>Dalmatian toadflax</i>	<i>5.66</i>	<i>NO</i>
<i>motorcycle</i>	<i>road to trail</i>	<i>diffuse knapweed</i>	<i>31.58</i>	<i>NO</i>
<i>motorcycle</i>	<i>user trail</i>	<i>Dalmatian toadflax</i>	<i>0.30</i>	<i>NO</i>

Cumulative Effects Alternative B and C

Management activities and disturbances prior to 1998 have contributed to the establishment and distribution of noxious or invasive weeds on the Forest. Past forest activities such as grazing, vegetation treatments, recreation uses, road maintenance and travel along roadways, including paved roads and highways, probably affected the abundance and distribution of noxious or invasive weeds. However, without information on known distribution of noxious or invasive weed species, the past effects of management actions are unclear. Sources of introduction for noxious or invasive weeds are often unknown or difficult to verify (*Crisp, 2011*).

Numerous management actions that could have affected the occurrence, distribution and extent of noxious or invasive weeds have occurred in the past. Since 1997 noxious or invasive weed surveys were generally conducted on forest projects that would have management actions associated with soil disturbance. However, until the adoption of the FEIS of 2005, management actions for noxious or invasive weeds were generally limited to incorporation of best management practices or to manual control of certain weed populations.

Recently, the Forest has released numerous biological control insects on Dalmatian toadflax, diffuse knapweed in certain areas of the forest. The success of these treatments is not fully known at this time. However, the objective is to decrease the density, areal extent and reproductive capacity of the targeted weeds within the forest. These biological control agents will not completely eliminate the targeted noxious or invasive weed species from the Forest but will contribute to the management objectives established in the FEIS. Numerous projects have been initiated, analyzed, or implemented since 1995.

The Arizona Department of Transportation and Coconino County have used herbicide to treat noxious or invasive weeds along roadways under their jurisdiction. Other entities have treated some infestations within the City of Flagstaff. Collectively, these treatments have reduced infestations in some areas and reduced the risk of noxious weeds spreading into new areas (*Crisp, 2011*).

The Travel Management Rule (TMR) for the Coconino National Forest was signed in 2011 and was implemented in May, 2012. The projected cumulative effects to this and other projects forest wide was the reduction in the numbers of motorized routes and the elimination of cross country travel. These reductions will be from the elimination of most cross-country travel and through the reduction of road density. This would aid in reducing pressures from vehicle travel in sensitive areas where plants and potential habitat occur. The reduction in cross country travel implemented by the TMR will, in principle, carry over into the management objectives of the Kelly Motorized Trails project in restricting cross country travel.

The Travel Management Rule (TMR) decision (September 2011) changed the motorized travel policy of the Coconino National Forest from one that was essentially “open unless posted closed” to “closed to unrestricted motorized cross-country vehicle travel unless specifically designated as open.” While the post-TMR decision policy is considered as part of the existing condition for this report, implementation of these restrictions began fairly recently on May 1, 2012. Because of this recent implementation, incidental use of non-system trails and roads is anticipated to continue over the short-term (1-3 years) while Forest visitors adjust to the new motorized travel system and policy, and while the Forest works to improve signage and decommission closed roads through additional NEPA analysis.

Certain areas of the Forest are closed to vehicle travel. These include wilderness areas and roadless areas. Additionally, the forest has a series of closure areas for various purposes. These are available at <http://www.fs.fed.us/r3/coconino/nepa/forest-orders/>. Many of these closures restrict motorized vehicle travel in specific areas. Although these closures were done for various reasons, some are complementary to noxious or invasive weed control. The closures motorized vehicle travel in certain areas and therefore reduce the risk of noxious or invasive weed dispersal in certain areas.

Projects analyzed since 2005 require consideration of the provisions of the *Final Environmental Impact Statement for Integrated Treatment of Noxious or Invasive Weeds, Coconino, Kaibab, and Prescott National Forests within Coconino, Gila, Mojave, and Yavapai Counties, Arizona (FEIS)*, specifically project survey and incorporation of best management practices. Collectively, the incorporation of these provisions and planned noxious or invasive weed treatments associated will provide noxious or invasive weed management and control within these project areas.

All of the above actions were beneficial management actions that supported management control objectives for noxious or invasive weeds on the Forest (*Crisp, 2011*).

These management decisions are past cumulative actions complementary to the proposed Kelly Motorized Trail project, and the direct and indirect effects discussed above, all of which will reinforce the management goals for controlling noxious or invasive weeds on the Coconino National Forest.

Threatened or Endangered Plant Species

EXISTING CONDITIONS

The Coconino National Forest provides habitat for two of these species, Arizona cliffrose (*Purshia subintegra*), an endangered species and San Francisco Peaks groundsel (*Senecio franciscanus*), a threatened species; however the project area does not contain suitable habitat for either species. As they are both outside of any effects of the project proposal, both geographically and biologically, they are eliminated from further review (*Baggs, 2000, USDI 1987*).

Region 3 Sensitive Plant Species

EXISTING CONDITIONS

The Forest would be required to incorporate mitigations for sensitive plants while following Forest Service Manual direction and complying with Federal Highway Standards. Crane (2006) discusses a summary of requirements for road Region 3 Sensitive plants. The publication contains

examples of successful mitigations where roads were constructed or maintained in or near Region 3 Sensitive plant populations without significant impacts to the plants. Design criteria for construction and decommissioning of roads would include the following: New construction would avoid impacts to Threatened, Endangered and Sensitive (TES) plant species. Prior to construction, coordination would occur with the Forest botanist to ensure that route alignments are chosen that would not impact TES plants. All decommissioning and restoration would be planned and implemented to avoid impacts to TES species.

The following two Region 3 Sensitive plant species occur within the project area within 200 feet of proposed routes:

Flagstaff Pennyroyal (*Hedeoma diffusum*)

Flagstaff pennyroyal is a small perennial, mat-like herb that grows on dolomitic limestone outcrops or soils in ponderosa pine forests. It has square, wiry stems and small oval opposite leaves. The flowers are blue and occur in clusters of one to three at the nodes. There are two major population areas for this species on the Coconino National Forest; the first extends roughly from Flagstaff, east to Marshall Lake and Fisher point, then south to the vicinity of Mountainaire, then to Lower Lake Mary. A second population area is near the rim of Oak Creek Canyon and its tributaries (Boucher, 1984; Phillips, 1984). Flagstaff pennyroyal occurs in three distinctive habitats in the ponderosa pine forest, rock pavement, cliffs and limestone. Forest canopy cover ranged from zero to 86%, averaging 26.5% (Phillips, 1984).

The Management Plan for *Hedeoma diffusum* Greene Elden, Flagstaff, Mormon Lake, and Sedona Ranger Districts (Boucher, 1984) was prepared in response to a proposal to list Flagstaff pennyroyal as a threatened species. This plan was recognized in the Forest Plan and is still a valid management document. Management direction outlined in the document should be followed when management activities occur in populations or suitable habitat for Flagstaff pennyroyal. Guidelines for Flagstaff pennyroyal that may apply to the Kelley Motorized Trails include guidelines for construction and maintenance of forest roads within or near the potential habitat for Flagstaff pennyroyal.

Arizona sneezeweed (*Helenium arizonicum*)

The proposed OHV trail within the Horse Park Tank continuing from Forest Road 9493C to Forest Road 700 is within the habitat of the Arizona sneezeweed (*Helenium arizonicum*). Arizona sneezeweed is a perennial herb that grows up to 4 feet tall with several stems. Flower heads consist of yellow to orange 3-lobed ray flowers and purplish-brown globular disk flowers and bloom July through September. Arizona sneezeweed grows at elevations from 7000 to 9000 feet. Hundreds of individuals may exist in a single population. This endemic species ranges from the Mormon Lake area southeastward to the White Mountains area where it grows in drainages, near springs, ponds and other wet areas and is found in several locations on the Coconino National Forest including Mormon Lake, Bear Park, Buck Springs, Alder Lake, Myrtle Lake, Fulton Spring, Stoneman Lake area, Bar M Canyon and several tanks.

Areas near water tend to be used more heavily by grazing animals. This usage often results in heavier grazing, compaction and trampling than comparable upland areas. Humans also tend to favor these areas for recreational use and contribute to trampling and compaction.

Table 20: Acres of Region 3 Sensitive Species and Habitat within 200' of proposed trail routes

<i>Design Feature</i>	<i>Need Condition</i>	<i>TES</i>	<i>Acres</i>	<i>Alt</i>
<i>motorcycle</i>	<i>New construction</i>	<i>Flagstaff pennyroyal</i>	<i>2.30</i>	<i>B</i>
<i>motorcycle</i>	<i>User trail</i>	<i>Flagstaff pennyroyal</i>	<i>2.32</i>	<i>B</i>
<i>OHV</i>	<i>Closed road</i>	<i>Arizona sneezeweed</i>	<i>2.30</i>	<i>C</i>
<i>motorcycle</i>	<i>New construction</i>	<i>Flagstaff pennyroyal</i>	<i>2.32</i>	<i>C</i>

ENVIRONMENTAL CONSEQUENCES

Alternative 1 (No Action Alternative)

Direct and Indirect Effects

If the No Action Alternative is selected, there would be no direct or indirect effects from management activities proposed in alternatives B and C. Examples of these impacts include crushing of plants; damage to potential habitat such damage to soils, fragmentation of habitat and introduction of noxious or invasive weeds into the habitats and/or populations of Region 3 Sensitive plant species.

Cumulative Effects

The boundary for this cumulative effects analysis is the Coconino National Forest, including the Kelly Motorized Trails project area. Though it is unclear to what extent these cumulative impacts would have on individual or populations of sensitive plants, but it is expected that based on expected increase of motorized use over the next several decades the cumulative impacts could potentially result in decreasing populations for one or several of these plant species over time.

The Travel Management Rule (TMR) for the Coconino National Forest was signed in 2011 and was implemented in May, 2012. The projected cumulative effects to this and other projects forest wide was the reduction in the numbers of motorized routes and the elimination of cross country travel. These reductions will be from the elimination of most cross-country travel and through the reduction of road density. This would aid in reducing pressures from vehicle travel in sensitive areas where plants and potential habitat occur. The reduction in cross country travel implemented by the TMR will, in principle, carry over into the management objectives of the Kelly Motorized Trails project in restricting cross country travel.

Alternatives B and C

Direct and Indirect Effects

Alternative C proposes decommissioning approximately 14 miles of closed routes. Decommissioned roads, as proposed in alternatives B and C, would have direct and indirect effects on sensitive plant habitat. If alternative B or C is accepted, the number of Forest trails would be increased by adding routes and adopting user created trails. This would result in an increased number of motorized vehicles within the habitat as compared to the present levels analyzed and designated in TMR (2011) User created trails may have already impacted plants and habitat. All routes would be surveyed before implementation of the project as part of the design features for both alternatives. Mitigation measures and rerouting would be implemented at that time. This would include identifying sensitive plant locations along the trail route and relocating the trail to a more acceptable location within the analyzed corridor.

The Forest would be required to incorporate mitigations for sensitive plants while following Forest Plan and Forest Service Manual direction, and complying with Federal Highway Standards. *Crane (2006)* discusses a summary of requirements for road Region 3 Sensitive plants.

Design criteria for construction and decommissioning of roads would include the following: New construction would avoid impacts to Threatened, Endangered and Sensitive (TES) plant species. Prior to construction, coordination would occur with the Forest botanist to ensure that route alignments are chosen that would not impact TES plants. All decommissioning and restoration would be planned and implemented to avoid impacts to TES species.

The Kelly Motorized Trails project proposes single track motorcycle designation within 200 feet of a significant occurrence of the Flagstaff pennyroyal on road FR008J in the vicinity of the School House Draw. Additional pennyroyal occurrences are present in the Priest Draw area, within the vicinity of established roads. These management actions would potentially result in a direct effect on the pennyroyal and its habitat; however this would be mitigated by design features that include surveying and avoidance during implementation. There are nearby occurrences of Dalmatian toadflax and the spread of this species would have the potential to invade sensitive plant habitat. Obliteration of roads and trails in certain sensitive areas may reduce these effects.

Interstate 17 has Dalmatian toadflax established along the entire corridor and there is concern for the potential of the invasive weed to spread during the construction of the proposed trailhead location off of FR 700H. Additionally, this area contains habitat for the Flagstaff pennyroyal, and there is an occurrence FR 703. Mitigation measures and field survey before implementation of project are part of the design features for both alternatives, including control of Dalmatian toadflax in the area of the trailhead and route and incorporation of the noxious or invasive weed BMPs

The proposed OHV trail within the Horse Park Tank continuing from FR 9493C to connect with FR700 is within the habitat of the Arizona sneezeweed (*Helenium arizonicum*). This Sensitive plant species grows in drainages, near springs, ponds and other wet areas and is found in several other locations in the proposed Kelly Motorized Trails project.

Table 21: Summary of effects of Region 3 TES plant species on Alternatives B and C

<i>Scientific Name</i>	<i>Common Name</i>	<i>Effects of Alternative B and C</i>
<i>Purshia subintegra</i>	Arizona cliffrose	Implementation of the Kelly Motorized Trails project will not affect the Arizona cliffrose (<i>Purshia subintegra</i>). There is not suitable habitat within the proposed project area.
<i>Senecio franciscanus</i>	San Francisco Peaks Groundsel	Implementation of the Kelly Motorized Trails project will not affect San Francisco Peaks Groundsel (<i>Senecio franciscanus</i>) or its habitat. The entire range of this species is limited to a Wilderness area that is closed to vehicle travel.
<u><i>Platanthera zothecina</i></u> <u><i>Cimicifuga arizonica</i></u> <u><i>Clematis hirsutissima</i></u> <u><i>Helianthus arizonensis</i></u> <u><i>Rumex orthoneurus</i></u> <u><i>Salix bebbiana</i></u> <u><i>Erigeron saxatilis</i></u> <u><i>Carex ultra</i></u> <u><i>Botrychium crenulatum</i></u> <u><i>Chrysothamnus molestus</i></u> <u><i>Heuchera eastwoodiae</i></u> <u><i>Penstemon nudiflorus</i></u> <u><i>Polygala rusbyi</i></u> <u><i>Eriogonum ericifolium</i></u> <u><i>Pellaea lyngholmii</i></u> <u><i>Desmodium metcalfei</i></u> <u><i>Cirsium parryi ssp. mogollonicum</i></u> <u><i>Arenaria aberrans</i></u> <u><i>Agave phillipsiana</i></u> <u><i>Eriogonum ripleyi</i></u> <u><i>Astragalus rusbyi</i></u> <u><i>Penstemon clutei</i></u> <u><i>Agave delamateri</i></u> <u><i>Salvia dorrii ssp. mearnsii</i></u>	Alcove bog orchid Arizona bugbane Arizona leatherflower Arizona sunflower Bulmer's dock Bebb's willow Cliff fleabane Cochise sedge Crenulate moonwort Disturbed rabbitbrush Eastwood Alum root Flagstaff beardtongue Hualapai milkwort Heathleaf Wild buckwheat Lyngholm's brakefern Metcalf's tick trefoil Mogollon thistle Mt. Dellenbaugh sandwort Phillips' Agave Ripley wild buckwheat Rusby's milkvetch Sunset Crater beardtongue Tonto Basin Agave Verde Valley sage	Implementation of the Kelly Trails project on the Coconino National Forest will have no impact on the following species as they do not occur within the proposed project area: the Alcove bog orchid; the Arizona bugbane; the Arizona leatherflower; the Arizona sunflower; the Bulmer's dock; the Bebb's willow; the Cliff fleabane; the Cochise sedge; the Crenulate moonwort; the Disturbed rabbitbrush; the Eastwood Alum root; the Flagstaff beardtongue, the Hualapai milkwort; the Heathleaf Wild buckwheat; the Lyngholm's brakefern; the Metcalf's tick trefoil; the Mogollon thistle; the Mt. Dellenbaugh sandwort; the Phillips' Agave; the Ripley wild buckwheat; the Rusby's milkvetch; the Sunset Crater beardtongue; the Tonto Basin Agave; and the Verde Valley sage sensitive plant species.

<i>Scientific Name</i>	<i>Common Name</i>	<i>Effects of Alternative B and C</i>
<u><i>Hedeoma diffusum</i></u>	Flagstaff beardtongue	Implementation of the Kelly Motorized Trails project may impact individuals of Flagstaff Pennyroyal (<i>Hedeoma diffusum</i>) and Arizona sneezeweed (<i>Helenium arizonicum</i>); however, the overall effect of this implementation may be beneficial by reducing direct and indirect impacts through mitigated efforts to reduce disturbances, soil compaction, crushing of plants, alteration of habitats, and by reducing avenues for conduction of weed infestations..
<u><i>Helenium arizonicum</i></u>	Arizona sneezeweed	

Cumulative Effects

The boundary for this cumulative effects analysis is the Coconino National Forest.

The Forest has gathered location and abundance data and considered Region 3 Sensitive plants in project planning and implementation for numerous projects. Mitigations for these species have been incorporated into many projects. Forest Service Manual Direction (FSM 2670.5 (19) and (FSM 2670.32) guided many of these mitigations. The current Coconino National Forest Plan addresses conservation and mitigation of three Region 3 sensitive plants: Flagstaff pennyroyal, Arizona sneezeweed. The Forest Plan recognizes the Management Plan for *Hedeoma diffusum* Greene Elden, Flagstaff, Mormon Lake, and Sedona Ranger Districts (*Boucher, 1984*), a document that mainly addresses the effects of timber sale-related activities. The plan contains mitigations for road construction and maintenance in the habitat of Flagstaff pennyroyal including acceptable distances for roadways from established populations of the plant and the effects of dust. For these factors, the implementation of the Kelly Motorized Trails project would be a complementary and cumulative action by re-enforcing the provisions of the Management Plan.

Cumulative effects to Region 3 Sensitive plants may include past and ongoing management actions by the U.S. Forest Service such as grazing, timber sales, fuels reduction projects, prescribed burning, recreational activities (motorized and non-motorized), construction, reconstruction and decommissioning of roads and trails, various land use projects including communications facilities, utility corridors and special use areas. Most of these actions were or are currently mitigated if they were or are under Forest Service control. Forest Service manual direction and/or Forest Plan provide direction for mitigations. Numerous projects have been initiated, analyzed, or implemented. Recent projects can be referenced on the Coconino National Forest website at <http://www.fs.fed.us/r3/coconino>.

Fire suppression and past alteration of the fire regime through suppression have affected all vegetation including several of the Region 3 Sensitive plant species through changes in tree

density and understory species composition and changes to hydrologic function. Elimination of fire in many areas of the Coconino National Forest has allowed tree canopy and stand density to increase in some areas, reducing the abundance or eliminating of most understory species. Elimination of fire and subsequent increase in forest density have probably reduced the amount surface water and soil moisture in some areas, therefore negatively affecting the potential habitat of some species.

The Travel Management Rule (TMR) decision (September 2011) changed the motorized travel policy of the Coconino National Forest from one that was essentially “open unless posted closed” to “closed to unrestricted motorized cross-country vehicle travel unless specifically designated as open.” While the post-TMR decision policy is considered as part of the existing condition for this report, implementation of these restrictions began fairly recently on May 1, 2012. Because of this recent implementation, incidental use of non-system trails and roads is anticipated to continue over the short-term (1-3 years) while Forest visitors adjust to the new motorized travel system and policy, and while the Forest works to improve signage and decommission closed roads through additional NEPA analysis.

The cumulative effects on TES and habitat within the proposed Kelly Trails project from management actions related to the TMR would include an increased disturbance from use and road maintenance on the remaining roads. By reducing the numbers of roads within the forest, use would more concentrated on remaining roads and would require more maintenance of existing roads. *Gelbard and Belnap (2003)* noted that increased levels of construction and maintenance increased the numbers of noxious or invasive weed species present along roadways as well as the density of weeds. These increases were attributed to increased disturbance from road maintenance and construction and tendency to introduce deeper layers of soil along roadways as road fill. Additionally, the levels of disturbance increased due to higher levels of use. Therefore, a potential negative effect of reducing the density of roads is the concentrated use and maintenance along remaining roads. This would lead to higher levels of disturbance and more opportunities for dispersal of noxious or invasive weed propagules along remaining roads and into sensitive habitats.

These effects could be mitigated by focusing control efforts along roadways to control existing and introduced infestations along the remaining open road system, decreasing the opportunities for vehicles to spread noxious and invasive weeds into sensitive habitats.

Cumulative effects not mitigated include non-Forest actions such as public travel, recreational visits by the public, wildfires and unmanaged grazing (wildlife and livestock). Activities on non-forest lands such as state and private lands have also contributed to cumulative effects on several species including timber harvest, fuels reduction projects, recreational uses and development. Land development on non-forest parcels has affected the amount of suitable habitat available on non-forest lands, reducing the amount of suitable habitat in these areas (*Crisp, 2011*).

Activities on non-Forest Service lands tend to have more adverse effects on populations and habitat because they are not subject to mitigation as similar actions on the Forest would be. The overall result is a possible reduction in the overall distribution and amount of suitable habitat for some species throughout their ranges (*Crisp, 2011*). Therefore, mitigation measures on Forest Lands are particularly important.

Determination of Effects

Implementation of the Kelly Motorized Trails project may impact individuals of Flagstaff Pennyroyal (*Hedeoma diffusum*) and Arizona sneezeweed (*Helenium arizonicum*); however, the overall effect of this implementation may be beneficial by reducing direct and indirect impacts through mitigated efforts.

Implementation of the Kelly Motorized Trails project may impact individuals of these species but is not likely to result in a trend toward federal listing or loss of viability.

Economics

This section of the specialist report describes how the economic impacts of the 3 alternatives considered in the Kelly Motorized Trails Project on the Coconino National Forest (also referred to as the Forest), were quantified. The quantification of economic impacts was a necessary component of measuring the environmental consequences of alternatives in this project and allows the responsible official to determine whether an alternative has a significant economic impact on the human environment. Economic impacts were measured as local (within a 50 mile radius of the project area) economic contributions resulting from money spent by visitors engaged in off highway vehicle (OHV) use on the Forest.

Methodology

To determine the local economic contributions in each of 3 alternative scenarios this analysis primarily depends on forest visitor information and preferences regarding recreational activities, visitor spending profiles, and conversion factors from economic impact modeling completed for the Coconino National Forest. Data on visitor demographics and preferences regarding activities, spending, and trip characteristics were available for the Forest from the National Visitor Use Monitoring (NVUM) program (English et al. 2002). Due to the limitations of the NVUM data, this report also considered other sources of data about motorized use on National Forest System lands in Arizona (Arizona State Parks 2003, Silberman 2003). For the purposes of this study, the use of the NVUM data seems most appropriate for this analysis, because the NVUM data is specifically designed to estimate visitor use by activity type, which includes both motorized and non-motorized recreation activities, whereas the state-wide surveys primarily focuses on motorized recreation. Since the economic impact analysis requires information from both motorized and non-motorized activities, the NVUM provides for a more statistically dependable information source for comparison of visitor uses of the Forest.

Data for the average group size of visitors and average spending of visitors were also used to calculate economic impacts of each alternative (Stynes and White 2005, Stynes and White 2006). This report focused on spending by Non-Local Overnight visitors because it is their spending that is of primary interest when estimating local economic impacts (Stynes and White 2006).

We assumed a range of possible increases in annual non-local OHV use levels for the Proposed Action. A study has clearly shown that the proposed trail, based on the amount of motorized trail being proposed, would meet the needs of most OHV users looking for a motorized recreation experience (Crimmins 1999). With these studies in mind, we made the assumption that the Alternative B would 'bring' an additional 2-20% non-local OHV use to the Forest. Alternative C would result in the designation of 23 more miles (31.5%) of trails compared to the Proposed Action. We assumed that this increase would not be a factor when non-local OHV users decide

whether or not to recreate on the Forest. The reason for this assumption is because studies have shown that OHV riders are most interested in having enough connected motorized trails to provide for one full day of riding (Crimmins 1999), and both alternatives provide for this. Therefore, Alternative C was also assumed to result in an additional 2-20% non-local OHV use on the Forest.

To calculate the total local economic contribution resulting from increased OHV use from each alternative, we used economic multipliers to account for the total economic change resulting from OHV-related spending (Minnesota IMPLAN Group 2004).) This allows us to account for the indirect benefits of money brought into the local economy from OHV-related spending. According to this FEIS the indirect local economic contributions from direct spending connected to OHV use by non-local visitors are an additional 20.65%, while induced effects are an additional 25.22%. Thus, the total economic multiplier is 45.78%.

These models do not account for potential impacts to non-market benefits resulting from Forest resources such as clean water, clean air, wildlife, the opportunity to recreate or other resources that benefit society directly or indirectly. This is a crucial point, because there is clear evidence that motorized recreation and even nature-based recreation can cause impacts to Forest resources (Cole 1986; Ouren et al. 2007) that may decrease nature's benefits. To address this issue, the effect of each alternative on potential non-market benefits will be discussed qualitatively

EXISTING CONDITIONS

Based on the NVUM data, a total of 4.559 million individuals visited the Forest in FY 2005, with 2.4% of these visitors recreating with the main purpose of OHV use. Thus, an estimated 109,416 OHV users visited the Forest during this time period. We used the national trip type segment shares by activity ratios to estimate the fraction of non-local visitors. Based on the national average 23% of OHV users were non-local overnight visitors, which in the case of the Forest means 25,166 people in FY 2005. Using the reported 2.5 people per travel party average, 10,066 non-local overnight parties engaged in OHV use on the Forest in the reporting year.

ENVIRONMENTAL CONSEQUENCES

Alternative 1 (No Action Alternative)

Direct and Indirect Effects

The average spending for OHV users at a high spending area such as the Forest was \$210 per party, in 2003 dollars. Multiplying this spending figure by the number of travel parties results in \$2.114 million direct and \$3.084 million total (direct + indirect) contribution to the local economy under this alternative. These numbers show the relatively small magnitude of contributions to the local economy from current OHV related recreation on the Forest.

This alternative would not result in any federal actions and thus would not result in any economic impact to the local economy.

Since this alternative is not expected to change the current ecological condition or use of the area, it would have very little or no impact on ecosystem services that result in clean water, wildlife habitat, or non-motorized recreation opportunity.

Cumulative Effects

There are no direct or indirect quantitative economic effects from this alternative, thus there are no cumulative impacts

Alternative B (Proposed Action)*Direct and Indirect Effects*

This alternative, as we assumed, would result in an increase of 2-20% in OHV related visitation to the Forest when compared to the No Action alternative, an increase of 201 to 2,013 additional travel parties per year. Using the same spending average as in the No Action alternative, we calculated a range of an additional \$42,210 to \$422,730 direct and \$61,571 to \$616,637 total local economic contributions. Again, these figures represent additional local economic contributions when compared to No Action.

This alternative would result in the opportunity for single track OHV users to experience a full day of riding on designated motorized trails and thus would increase consumer surplus of this area for those who would enjoy this opportunity. At the same time, it has been shown that motorized recreation can impact others' ability to attain a satisfactory recreation experience and/or can negatively affect ecosystem services such as wildlife habitat or clean water (Cole 1986; Ouren et al. 2007). The Kelly Motorized Trails Project area was identified for consideration of designated motorized trails specifically because this area lacked threatened, endangered, or sensitive wildlife habitat; popular hiking trails, or water sources and associated riparian habitat (see Wildlife, Recreation, and Soil/Hydrology Specialist Reports in the project record). Thus, while it is possible that motorized recreation in this area may decrease the satisfaction of some Forest users who hike in this area or may result in a slight decrease in ecosystem services for more common species, it is expected to have a larger increase in satisfaction and thus consumer surplus for motorized recreation enthusiasts, especially those who prefer single track trails.

Cumulative Effects

This alternative could result in \$61,571 to \$616,637 total local economic contributions. This total is less than one tenth of one percent of the local economy. Thus, the calculated ranges of direct and total local economic contributions do not seem to be significant on the local economic level. As discussed above, generally stronger factors shape the local economy. For example, the forces that led to the economic downturn beginning in late 2008 and slow recovery would be completed unaffected by the economic effects of this alternative

This project is expected to slightly counteract the economic impact of the recent Travel Management decision, which designated a system of roads, trails, and areas and restricted motor vehicle use to these routes and areas. The Travel Management decision strongly limited single track trail for motorized use and is expected to result in an economic decline from decreased visitation for single track motor vehicle recreation activities. This project would likely counteract this effect of travel management to some degree by providing an opportunity for a full day of single track riding and ATV/UTV riding, which is desirable to Forest visitors (Crimmins 1999 and USDA Forest Service 1999). Thus, this alternative would both slightly counteract the expected decrease in local economic contribution from motorized use identified from the 2011 Travel Management EIS decision, and would also counteract the loss of satisfaction and

consumer surplus from motorized recreation single track riders from losing the ability to experience a day of motorized trail riding.

Alternative C

Direct and Indirect Effects

Under our assumptions of additional OHV related visitor use due to the project, this alternative would result in the same local economic contribution figures and very similar non-market costs and benefits as the proposed action.

Cumulative Effects

This alternative would not result in a significantly different economic impact compared to the proposed action either in terms of direct and indirect economic impacts on the local economy, and thus would have similar cumulative effects.

Range

The issue of motorized recreation and its influence on structural range improvements (primarily fencing and water developments), historic vegetation monitoring plots, livestock management activities, and livestock production and health was identified by the Interdisciplinary Team and members of the public during the public scoping of the Kelly Motorized Trail Project. This section identifies existing structural range improvements within the project area and the livestock management requirements for each allotment within the project area. This section also includes an analysis of effects that the action alternatives would have on structural range improvements, historic vegetation monitoring plots, livestock management, and livestock production and health issues.

Methodology

Current and historical grazing permit records located at the Flagstaff Ranger District were researched to determine the number and type of structural range improvements within the project area. These records were also used to determine the livestock management requirements for each allotment.

The analysis of how the alternatives may affect livestock health was based on a literature search of scientific peer-reviewed research studies and personal communications with experts in the field of livestock production and livestock health.

EXISTING CONDITIONS

Within the project area there are three active grazing allotments; Casner Park/Kelly Seep allotment, Mud Springs allotment, and the Windmill allotment. In addition, the Lake Mary allotment falls within the project area; however this is a vacant grazing allotment which is managed as a forage reserve.

Casner Park/Kelly Seep Allotment

The Casner Park/Kelly Seep allotment is permitted 395 head of yearling cattle from June 1 to October 31. The allotment is divided in to 11 pastures and the current Allotment Management Plan requires a deferred, rest-rotation livestock management system. Allotment pastures which fall within the project area include: North Coulter, South Coulter, Cowboy, East Kelly, Little Horse, Mountaineer, Saginaw, and Shipping. Within the project area there are approximately 35 miles of allotment boundary fence; approximately 26 miles of pasture fence; approximately 42 earthen stock tanks; and approximately 3 livestock water systems (wells, spring developments, water storage tanks, pipelines, and troughs).

Mud Springs Allotment

The Mud Springs allotment is permitted 200 head of yearling cattle from June 1 to October 31. The allotment is divided in to 4 pastures and the current Allotment Management Plan requires a deferred rotation livestock management system. Allotment pastures which fall within the project area include: Howard Mountain and West Antelope. Within the project area there are approximately 6 miles of allotment boundary fence; approximately 3 miles of pasture fence; approximately 21 earthen stock tanks; and approximately 2 livestock water systems (wells, spring developments, water storage tanks, pipelines, and troughs).

Windmill Allotment; Munds Unit

The Munds Unit of the Windmill allotment is permitted 250 head of adult cattle from June 1 to October 31. The Munds Unit is divided in to 5 pastures and the current Allotment Management Plan requires a deferred rotation livestock management system. Allotment pastures which fall within the project area include: Mud Lake and Newman. Within the project area there are approximately 7 miles of allotment boundary fence; approximately 2 miles of pasture fence; approximately 9 earthen stock tanks; and no livestock water systems (wells, spring developments, water storage tanks, pipelines, and troughs).

Lake Mary Allotment

The Lake Mary allotment is also within the project area. This is a vacant allotment which is managed as a forage reserve; this allotment is used to provide temporary livestock use to National Forest permittees who may not be able to use their existing allotment due to wildfires, drought, or other resource related issues. This allotment is divided in to 4 pastures and when it is necessary for livestock to use this allotment, a deferred rotation livestock management strategy is used. Allotment pastures which fall within the project area include: Airport, School House, and School House Holding. Within the project area there are approximately 10 miles of allotment boundary fence; approximately 9 miles of pasture fence; approximately 8 earthen stock tanks; and no livestock water systems (wells, spring developments, water storage tanks, pipelines, and troughs).

ENVIRONMENTAL CONSEQUENCES

Alternative 1 (No Action Alternative)

Direct and Indirect Effects

Under the No Action Alternative, no new OHV or motorcycle trails would be constructed. As a result, no structural range improvements would be effected. Issues relating to the integrity of the existing structural range improvements would not increase above the level currently experienced. Since the integrity of existing structural range improvements would be maintained, required livestock management activities would not be affected above the level currently experienced (ie. Cattle in the correct pastures and allotments to insure grazing use is managed to maintain or enhance condition classes of full capacity rangelands). Historic vegetation monitoring plots would not be potentially impacted by new trail construction and/or motorized vehicle use off the authorized trail system. The potential issues related to livestock production and health would not increase above the level currently experienced. Indirect effects may result in additional legal/illegal motorcycle/OHV pressure and impacts on other allotments on the Forest.

Cumulative Effects

The focus of this analysis is on structural range improvements, historic vegetation monitoring plots, and livestock management activities. These structures and activities receive very little influence from off site activities. As a result, the geographical extent of the cumulative effects analysis is confined to the portions of the project area that are located on the Casner Park/Kelly Seep allotment, the Mud Springs allotment, the Munds Unit of the Windmill allotment, and the Lake Mary allotment. The past, present, and reasonably foreseeable future activities considered in the cumulative effects analysis include: Coconino National Forest Travel Management Rule, Timber and Fuels projects, and prescribed burning activities.

Motorized recreation, in combination with timber/fuels projects, and prescribed burning can cumulatively affect the integrity of structural range improvements, historic vegetation monitoring plots, and livestock management activities. Under this alternative, there would be no direct or indirect effects from new OHV or motorcycle trails on structural range improvements, historic vegetation monitoring plots, and livestock management activities and as a result, there would be no cumulative effects.

This alternative provides the most cumulative protection to structural range improvements, historic vegetation monitoring plots, and livestock management activities by not authorizing new OHV or motorcycle trails which would be additive to the other activities. Timber, fuels, and prescribed burning projects would continue to occur within the analysis area, creating localized impacts to structural range improvements, historic vegetation monitoring plots, and livestock management activities. Changes in road management and OHV use through the Travel Management Rule would cumulatively lessen the impact to structural range improvements, historic vegetation monitoring plots, and livestock management activities across the analysis area.

Alternative B (Proposed Action)

Direct and Indirect Effects

The Proposed Action would include installing and maintaining approximately 17 motorcycle/OHV cattleguards and equestrian gates. Without regular maintenance of these cattleguards, cattle would have easy access to other pastures and/or allotments. Without the ability to insure livestock containment, it will be extremely difficult to implement planned grazing and livestock management. Potential effects to historic vegetation monitoring plots due to illegal motorized vehicle use off the authorized trail system would occur. Also, possible effects to earthen stock tanks and other water developments due to illegal motorized vehicle use off the authorized trail system. These effects could reduce the amount and seasonal longevity of water available for livestock and wildlife.

Livestock production and health

An extensive literature search was conducted for information related to motorized vehicle use and subsequent effects on livestock production and health. No literature was found directly related to this issue but several publications were located that studied the effects of loud noise on livestock production/health (Hanson, 2008; Head, 1992; Raleigh, 1988; Stokowski, 2000; USAF/USFWS, 1988). Most of these studies showed no effect to production as a result of loud noises and that cattle would resume normal activity after a period of becoming accustomed to the noise.

Due to the lack of published literature on this subject, input was solicited from University and Cooperative Extension animal science/animal behavior experts. Personal communications with these livestock production experts predict no effect after a period of acclimatizing (Dr. Beth Burritt, personal communication, February 2, 2012; Dr. Larry Howery, personal communication, February 8, 2012).

Cumulative Effects

The geographical extent, timeframe, and past, present, and reasonably foreseeable future activities are the same as described in the No Action Alternative.

Under this alternative, increased motorized recreation as a result of new OHV and motorcycle trails would have direct effects to structural range improvements, historic vegetation monitoring plots, and livestock management activities. When the effects from new OHV and motorcycle trails are added to the effects from the other activities, the overall cumulative effect on structural range improvements, historic vegetation monitoring plots, and livestock management activities is expected to increase. Changes in road management and OHV use through the Travel Management Rule would cumulatively lessen the impact to structural range improvements, historic vegetation monitoring plots, and livestock management activities across the analysis area.

Alternative C

Direct and Indirect Effects

Same effects identified in the Proposed Alternative B plus approximately 5 additional motorcycle/OHV cattleguards and equestrian gates.

Cumulative Effects

Same as cumulative effects identified to the Proposed Action, although a slight increase on structural range improvements, historic vegetation monitoring plots, and livestock management activities with the additional miles.

Wildfire Risk

The issue of motorized recreation and its influence on wildfire risk was an issue identified by at least one member of the public during public scoping of the Kelly Motorized Trail Project. This section considers concerns about whether motorized trails may increase or decrease wildlife starts from motorized use and whether road closures would decrease the capacity of wildfire response.

Methodology

This section considers concerns identified in public comments about whether motorized restrictions may increase or decrease wildlife starts from motorized use and whether road closures would decrease the capacity of wildfire response.

People raised these two concerns about wildfires:

1. *Closing routes to motorized use increases the chance of having larger wildfires because it would take longer for firefighters to get to them.*
 - This concern is addressed by reviewing how the proposed action and alternatives would affect **firefighter's response time**
2. *Motorized use of the forest increases the risk of wildfires caused by peoples' activities.*
 - This concern is addressed by reviewing the **number and causes of wildfires** and considering how the alternatives may contribute to wildfire starts and wildfire risk.

Review and analysis of how alternatives may affect both measures of firefighter response time and the number and causes of wildfire was based on a literature search of scientific peer-reviewed research studies on the relationship between motorized use and wildfire starts.

EXISTING CONDITIONS

Firefighters' Response Time: The time it takes firefighters to get to wildfires varies greatly depending on the fire's location. Fire suppression efforts in areas of remote and rough terrain can be constrained by slower reporting and response times and limited access. Firefighters can easily drive to abandoned campfires in Forest Service campgrounds, for example. On the other hand, they must hike or fly to fires located in wilderness areas.

In general studies have found that greater access (due to proximity to private land and/or forest roads) leads to faster reporting of wildfires and greater success with suppression efforts. A study that looked at factors influencing wildfire in northern Arizona ponderosa pine forest type found that topographic roughness and low road density were the two greatest factors affecting wildfire size (Dickson et al. 2006). Another recent study in the International Journal of Wildland Fire found that the presence of roads correlated heavily with fire control boundaries, thus being a key factor in fire cessation (Narayanara et al. 2011).

Number and Causes of Wildfires:

In recent years, areas of western forests have been increasingly impacted by wildfires, burning homes and wildlands, with suppression costs of more than \$1 billion per year from federal land-management agencies. Since about the mid-1970s, the total acreage of areas burned and the severity of wildfires in pine and mixed-conifer forests have increased. If temperatures increase, precipitation decreases, and overall drought conditions become more common, fire frequency and severity may be exacerbated. In addition, continued population growth will likely cause greater human-started fires, since humans start nearly half of the fires in the Southwest.

Lightning and people caused all of the wildfires on the Coconino National Forest during the last 10 years. The Coconino National Forest averages about 400 wildfires a year, burning an average of 4,000 acres per year. Roughly half of wildfire events are human caused, the large majority of which are abandoned campfires. The vast majority of these fires are stopped at 1/10th of an acre. Human ignitions may cause large destructive fires but most large fires in northern Arizona are caused by lightening (Dickson et al. 2006).

At least one study documents that off-highway vehicles can directly cause wildfires when grasses and forest litter come in contact with hot exhaust systems, exhaust, and hot manifolds for an extended period of time (Baxter 2002). This study, however, does not examine the probability of ignition over a wide range of conditions, and forest fuels only catch fire in very specific conditions.

The large majority of research has not found OHV or motorized use to be a cause of wildfire ignitions, but forest access is regularly correlated with wildfire starts (Dickson et al. 2006, Sturtevant and Cleland 2007, Romero-Calcerrada 2008). Vehicles indirectly aid in starting wildfires by aiding in access to remote areas of the Forest. Yang et al. (2007) found that a large majority of human-ignited wildfires occurred within 500 feet of an existing road where there is access to the adjacent forest.

Campfires comprise the main source of all human-caused wildfires in the last 10 years at approximately 66 percent (any abandoned campfire is counted as a wildfire). Arson, downed power lines, chainsaws, and smoking also contributed.

ENVIRONMENTAL CONSEQUENCES

Alternative 1 (No Action Alternative)

Direct and Indirect Effects

The number of wildfires caused by people is expected to stay approximately the same over the next several decades. Though population levels adjacent to the Forest continue to grow, the implementation of the recent designated road and trail system on the Forest would decrease Forest access and thus limit the number of human caused wildfire starts over the next several years from existing conditions. This is supported by research that has found urban interface areas and prevalence of roads are the two strongest influences on human-caused ignitions of wildfire (Romero-Calcerrada et al. 2008).

Although the number human ignitions are expected to be static over the next several decades, this may or may not result in an increase in the number of acres burned by wildfires. Roads have a

major influence on fire suppression efforts both by providing control lines and by allowing more efficient firefighter access (Narayanara et al. 2011). Over the next decade, ten percent to twenty-five percent of the non-designated roads in the Kelly Motorized Trails Project area may become naturally revegetated, slightly decreasing motorized access for emergency wildfire response. It is unlikely this would have any measurable effect on wildfire size as the Kelly project area is completely surrounded by major roads (I-17, Lake Mary Road, and the Flagstaff Airport) and includes a high density of non-designated roads available for emergency access.

Cumulative Effects

Past, present, and reasonably foreseeable actions that would affect wildfire risk or response time include any project that locally affects visitor access, any project that would affect response time to the project area, or activities or other trends affecting wildfire risk in the project area. The September 2011 decision on the Travel Management Project is expected to limit vehicular access to the Forest by restricting motor vehicle use to designated roads, trails, and areas. This activity was considered as part of the existing condition, and implementation of these restrictions began in May 2012. This implementation will not result in any cumulative impacts to wildfire ignitions or response beyond what was discussed above.

Other activities that would result in a cumulative effect would be the 2006 Mountainair Fuels Reduction/Forest Health Project and the 2009 Munds Park Fuels Reduction and Forest Health Project. Both of these projects are expected to decrease the risk of high intensity wildfire in and adjacent to the project area over the next several decades. This reduction in the potential for wildfire to spread would counteract the very slight reduction of access (and thus emergency response) from revegetated roads in the project area.

Alternative B (Proposed Action)

Direct and Indirect Effects

The risk of wildfire ignition caused by people is expected to slightly increase due to allowing for more motorized access in the project area. This alternative would add or convert approximately 73 miles of motorized trails for motorized recreation, which would increase access in the project area increasing the likelihood of wildfire ignition. This is supported by research that has found urban interface areas and prevalence of roads are the two strongest influences on human-caused ignitions of wildfire (Romero-Calcerrada et al. 2008).

Although the risk of human ignitions is expected to slightly increase within the project area, this may or may not result in an increase in the number of acres burned by wildfires. First, the increase in risk of human ignition is expected to be of very small magnitude as this slightly increased risk is based on studies that have shown a correlation between road density and wildfire starts and not causation. The correlation between human caused ignitions and vehicle access may result from a number of causes, the most common of which are arson, machinery use, infrastructure such as power lines, and abandoned campfires. In general these activities are highly unlikely to occur in the Kelly Motorized Trails Project Area due the concentrated motor vehicle use expected to occur in the project area. Yet some causes of wildfire such as from OHVs themselves and from activities such as smoking would be more likely to occur in the project area

as a result of the motorized trail designations. This increase in risk of wildfire ignition cannot be quantified, but it is extremely small.

In addition to affecting ignitions, vehicle access has a major influence on fire suppression efforts both by providing control lines and by allowing more efficient firefighter access (Narayanara et al. 2011). This project would involve both the construction of new trails (33 miles) and the conversion of existing roads to trails (23 miles). These routes would function to also serve as access and control lines for wildfire suppression efforts. This may have an effect toward limiting wildfire size, but only to a small extent as the Kelly project area is completely surrounded by major roads (I-17, Lake Mary Road, and the Flagstaff Airport) and includes a high density of non-designated roads available for emergency access.

Overall, though ignitions may be slightly increased in the project area, so would the effectiveness of fire suppression efforts due to increased access and control lines. Thus, this alternative would not likely result in a measurable increase in acres burned from human ignition in or adjacent to the project area.

Cumulative Effects

Past, present, and reasonably foreseeable actions that would affect wildfire risk or response time include any project that locally affects visitor access, any project that would affect response time to the project area, or activities or other trends affecting wildfire risk in the project area. The September 2011 decision on the Travel Management Project is expected to limit vehicular access to the Forest by restricting motor vehicle use to designated roads, trails, and areas. This activity was considered as part of the existing condition, and implementation of these restrictions began in May 2012. This implementation would result in decreased forest-wide access, including the restriction of off-road travel in the project area. Thus, the implementation of travel management would be slightly counteracting the effect of increasing access affected by this alternative and the number wildfire ignitions is not expected to change.

The potential for human ignited wildfires to burn in the project area would be affected by increasing risk of wildfire caused by climate change and by projects reducing wildfire risk in the project area. Studies have shown that in the Southwest, abrupt climate change may result in heightened fire activity (Marlon et al. 2009). This change in environment could indirectly but cumulatively contribute to factors affecting the likelihood of a human-ignited wildfire to burn in the Kelly Motorized Trails Project area.

Other activities that would result in an opposite cumulative effect include the 2006 Mountaineer Fuels Reduction/Forest Health Project and the 2009 Munds Park Fuels Reduction and Forest Health Project. Both of these projects are expected to decrease the risk of high intensity wildfire in and adjacent to the project area over the next several decades. This reduction in the potential for wildfire to spread would counteract the very slight increase in potential for wildfire ignition.

Alternative C

Direct and Indirect Effects

The risk of wildfire ignition caused by people is expected to slightly increase due to allowing for more motorized access in the project area. This alternative would add or convert approximately 96 miles of motorized trails for motorized recreation, which would increase access in the project

area by approximately 32% compared to Alternative 2 and would increase the likelihood of wildfire ignition. This is supported by research that has found urban interface areas and prevalence of roads are the two strongest influences on human-caused ignitions of wildfire (Romero-Calcerrada et al. 2008).

Although the risk of human ignitions is expected to slightly increase within the project area, this may or may not result in an increase in the number of acres burned by wildfires. First, the increase in risk of human ignition is expected to be of very small magnitude as this slightly increased risk is based on studies that have shown a correlation between road density and wildfire starts and not causation. The correlation between human caused ignitions and vehicle access may result from a number of causes, the most common of which are arson, machinery use, infrastructure such as power lines, and abandoned campfires. In general these activities are highly unlikely to occur in the Kelly Motorized Trails Project Area due the concentrated motor vehicle use expected to occur in the project area. Yet some causes of wildfire such as from the OHVs themselves and from activities such as smoking would be more likely to occur in the project area as a result of the motorized trail designations. This increase in risk of wildfire ignition cannot be quantified, but it is extremely small.

In addition to affecting ignitions, vehicle access has a major influence on fire suppression efforts both by providing control lines and by allowing more efficient firefighter access (Narayanara et al. 2011). This project would involve both the construction of new trails (45 miles) and the conversion of existing roads to trails (28.5 miles). These routes would function to also serve as access and control lines for wildfire suppression efforts. This may have an effect toward limiting wildfire size, but only to a small extent as the Kelly project area is completely surrounded by major roads (I-17, Lake Mary Road, and the Flagstaff Airport) and includes a high density of non-designated roads available for emergency access.

Overall, though ignitions may be slightly increased in the project area, so would the effectiveness of fire suppression efforts due to increased access and control lines. Thus, this alternative would not likely result in a measurable increase in acres burned from human ignition in or adjacent to the project area.

Cumulative Effects

Past, present, and reasonably foreseeable actions that would affect wildfire risk or response time include any project that locally affects visitor access, any project that would affect response time to the project area, or activities or other trends affecting wildfire risk in the project area. The September 2011 decision on the Travel Management Project is expected to limit vehicular access to the Forest by restricting motor vehicle use to designated roads, trails, and areas. This activity was considered as part of the existing condition, and implementation of these restrictions began in May 2012. This implementation would not result in any cumulative impacts to wildfire ignitions or response beyond what was discussed above.

The potential for human ignited wildfires to burn in the project area would be affected by increasing risk of wildfire caused by climate change and by projects reducing wildfire risk in the project area. Studies have shown that in the Southwest, abrupt climate change may result in heightened fire activity (Marlon et al. 2009). This change in environment could indirectly but cumulatively contribute to factors affecting the likelihood of a human-ignited wildfire to burn in the Kelly Motorized Trails Project area.

Other activities that would result in a cumulative effect would be the 2006 Mountaineer Fuels Reduction/Forest Health Project and the 2009 Munds Park Fuels Reduction and Forest Health Project. Both of these projects are expected to decrease the risk of high intensity wildfire in and adjacent to the project area over the next several decades. This reduction in the potential for wildfire to spread would counteract the very slight increase in potential for wildfire ignition.

Chapter 4 - Consultation and Coordination

The Forest Service coordinated with Arizona Department of Game and Fish in the development of the Action Alternatives and design features. The Forest Service also consulted and notified the following individuals, Federal, state and local agencies, tribes and non-Forest Service persons during the development of this environmental assessment, as well as an additional 1,424 local residents:

FEDERAL, STATE, AND LOCAL AGENCIES

Coconino County Parks and Recreation
City of Flagstaff Recreation Department
United States Fish and Wildlife Service

TRIBES

Fort McDowell Yavapai Nation
Havasupai Tribe
Hopi Tribe
Hualapai Tribe
Pueblo of Zuni
San Carlos Apache Tribe
Tonto Apache Tribe
White Mountain Apache Tribe.
Yavapai-Apache Nation

Yavapai-Prescott Tribe
Navajo Nation
Navajo Bodaway/Gap Chapter
Navajo Leupp Chapter
Navajo Lechee Chapter
Navajo Coalmine Canyon Chapter
Navajo Nation Cameron Chapter
Coppermine Chapter

ORGANIZATIONS

Arizona Riders Association
Coconino Trail Riders
Flagstaff Biking Organization
Friend of Northern Arizona Forests
Center for Biological Diversity
The Nature Conservancy
Sierra Club – Grand Canyon Chapter

Environmental Justice Analysis (EO 12898)

Environmental justice is an executive order (EO 12898) which requires that each Federal agency make achieving the environmental justice part of its mission by identifying and addressing, as appropriate, disproportionately high and adverse human health or environmental effects of its programs, policies and activities on minority populations and low income populations.

Environmental justice is the fair treatment and involvement of all people regardless of race, color, national origin, or income with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies. Fair treatment means that no group of people, including racial, ethnic, or socioeconomic groups, should bear a disproportionate share of the negative environmental consequences resulting from industrial, municipal, and commercial operations or the execution of federal, state, local, or tribal programs and policies. Inequities can result from a number of factors, including distribution of wealth, housing and real estate practices, and land use planning that may place African Americans, Latinos, and Native Americans at greater health and environmental risk than the rest of society (Bullard 1993).

In 2000, Native Americans were the largest minority group in Coconino County (28.51%) while Hispanics represented the predominant minority group in Gila and Yavapai Counties (16.65% and 9.78% respectively) (de Steiguer et al. 2005). Only Native Americans represent a greater proportion of the population than the state average, and thus only this group is considered a minority population to be considered for environmental justice impacts in this analysis. Note that individuals claiming Hispanic heritage may also claim identification with other ethnic and racial groups and be counted in those categories as well. As of 2000, individuals of Hispanic origin accounted for 25.25% of the statewide population (de Steiguer et al. 2005).

None of the alternatives would have a disproportionate health or environmental risk on any minority or low income communities as authorizing motorized trails focus on providing designated recreation in locations that protect forest resources. The impacts of each action alternative are expected to result in slight improvements to water quality, wildlife habitat, cultural resources, non-motorized recreation opportunities and other forest resources over the long-term. None of the alternatives would have a disproportionate economic effect on any community or minority or low-income population. The project would result in the opportunity for single track OHV users to experience a full day of riding on designated motorized trails and thus would increase consumer surplus of this area for those who would enjoy this opportunity. There is no evidence that any loss of jobs or income would disproportionately affect Native American or Hispanic populations in or adjacent to the Coconino National Forest, and would result in a slight local economic contribution.

Potentially affected tribes have been consulted and effects on their rights and concerns have been considered within the analysis of alternatives. American Indian populations will not be disproportionately impacted under any alternative with avoidance of heritage resources, consideration of traditional values, and reasonable access and forest product collection allowed through agreements, permits, and recognition of their sovereignty and legal rights.

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Appendix A – Design Criteria

The following are design criteria for Motorcycle and OHV trail construction and operation used to develop the Proposed Action and Action alternatives.

Motorcycle

- Approximately 6 miles of existing motorcycle trail would be incorporated into this project. These adopted sections include parts of the user created “Airport Trails.” Some short sections of these adopted trails would require some small re-routes to incorporate proper grade and deal with erosion issues before they may become Forest System Trails.
- Six miles of closed road would be converted to trail. Referred to as road to trail conversion, a desired trail surface of 18 to 36 inches is created by obliterating and rehabilitation of a road, while using a portion of the old road bed for trail tread. This is proposed in locations where a road is no longer needed for any administrative purposes in a suitable trail location.
- In addition to adoption and road to trail conversion, the 37 miles of the trail system designed for motorcycle would also consist of 25 miles of new trail construction. Because of the narrow nature of the trail large portions would generally be constructed by hand crews, but some locations may be conducive to construction with mechanical tools including trail dozers.
- Trail and road crossings would be constructed to deter and limit use by other motorized vehicles. This could be done in a variety of techniques including the use of vegetation, rock, or constructed features to limit the width of tread less than 36 inches. Vehicles with a width wider than 36 inches would not be permitted on trails designated for motorcycles. This would be enforceable through the Motor Vehicle Use Map.
- In general trail tread would consist of native material 18 to 36 inches wide, with a native surface material. Tread would be generally smooth, with some protrusions, like rock, up to 6 inches in variation.
- To prevent erosion and rutting trail would generally have a 12% or less grade, but may exceed this grade up to 25% in short pitches less than 200 feet. Layout would include grade reversals and rolling dips where necessary to move water off the trail surface.
- The general clearing widths for the trail should be at least 4 ½ feet, clearing height should be up to 8 feet. All standing vegetation would be cleared within this corridor.
- The trail would be laid out in manner that incorporates numerous curves and few long straight sections while incorporating quality lines of sight. This would prevent excess speeds, but still allow riders to maintain good visibility to oncoming traffic.
- While designed primarily for motorcycles, these 37 miles of trail would still be open to non-motorized uses including mountain bikes, hikers, and equestrians. Appropriate signage would be placed informing users the probability of encountering motorcycles, bikes, hikers, and equestrians.

- The proposed trail crosses several cattle pastures and would need to cross fence in 11 locations. These fence crossings would require the installation of uniquely designed OHV cattle guards that raised to allow for easy maintenance and handle only light vehicles like motorcycles. Cattle guards would be installed in appropriate locations with good sight and straight angles and would be properly signed for safety. All cattle guard locations would also include simple gates next to fence crossings to allow for equestrian crossings.

OHVs

- These trails would be designed and managed for vehicles less than 62 inches in width. This includes Utilitarian Off-Highway Vehicles (UTVs), Side-by-sides, and Recreation Off-Highway Vehicles (ROVs); these can be described as motor vehicles designed to travel on four or more tires with a steering wheel, and non-straddle seating. These trails would also be managed for All-Terrain Vehicles (ATVs) these can be defined as motor vehicles designed to travel on three or more low pressure tires, have handle-bar type steering, and a seat designed to be straddled by the operator.
- The trails designed for OHVs would total 36 miles total. Of this 11 miles would include current open roads. These are portions of roads designated for “all vehicles” with unimproved natural surfaces (maintenance level 2). Management of these roads would change little and all motor vehicles would be allowed on these segments. The only modifications of these roads would include directional signage for the trail system.
- Seventeen miles of closed road would be converted to trail. Referred to as road to trail conversion, a desired trail surface of 62” using a portion of the old road bed for trail tread. This is proposed in locations where a road is no longer needed for any administrative purposes in a suitable trail location. Only OHVs less than 62 inches would be allowed on these portions of the trail.
- Road to trail conversion may require additional trail structures and features including rolling dips and integrated water control with drainage.
- The remaining OHV trail would consist of 8 miles of new trail construction. This construction could be completed with heavy equipment including trail dozers and may also include some work from hand crews.
- In general trail tread would consist of native material 60 to 72 inches wide, with a native surface material. Tread would be generally smooth, with some protrusions, like rock, up to 6 inches in variation.
- To prevent erosion and rutting trail would generally have a 12% or less grade, but may exceed this grade up to 15% in short pitches less than 200 feet. Layout would include grade reversals and rolling dips where necessary to move water off the trail surface.
- The general clearing widths for the trail should be a maximum of 12 feet, clearing height should be up to 8 feet. All standing vegetation would be cleared within this corridor.
- With the exception of portions of OHV trail sharing roads open to all vehicles, all other road crossings and unions would be constructed to deter and limit use by motor vehicles larger than 62 inches in width. A variety of techniques would be used to create choke

points of vegetation, rock, or other constructed features to limit the vehicle width onto these OHV trail. Vehicles over 62 inches would not be permitted on trails designated for OHVs, this would be signed and enforceable through the Motor Vehicle Use Map.

- The proposed trail crosses several cattle pastures and would need to cross fence in 10 locations. Approximately 5 existing cattle guards exist on the OHV trail. The other 5 fence crossings would be negotiated by simply designed OHV cattle guards. These cattle guards would withstand up to 2,000 pound vehicles and have slightly raised crossings to facilitate less maintenance needs. Cattle guards would be installed in appropriate locations with good sight and straight angles and would be properly signed for safety. All cattle guard locations would also include simple gates next to fence crossings to allow for equestrian crossings.

Appendix B - Terrestrial Ecosystem Survey Map Unit Soil Hazard Interpretations and Condition.

The following Soil map unit interpretations are listed below for the primary soil types and used for analysis. These interpretations provide a starting point for identifying soil hazards. Map units may have several soil types and the relevance of the interpretation varies depending on a site's topography, vegetation, ground cover and disturbance. Interpretations were verified through field work to assess the level of risk.

Map Unit	Soil type and setting	Soil Condition	Erosion Hazard	Trail Hazard	Off Road Travel Hazard Level	Road limitation
Common soils within trail prism						
50	Vertic Haplaquolls (wet/ fine on basalt fill)	Satisfactory	Severe	Severe (Too wet)	Severe (Erodes easily)	Severe (Poorly drained)
53	Cumulic Haploborolls (Bottomlands from limestone)	Satisfactory	Slight	Slight	Moderate (Low strength)	Moderate (Low strength)
55	Pachic Argiborolls (Bottomlands from basalt)	Satisfactory	Slight	Severe (Low strength)	Severe (Low strength)	Severe (Low strength)
550	Typic Eutroboralfs (limestone escarpments)	Satisfactory	Moderate	Moderate (Too steep)	Moderate (Erodes easily)	Moderate (Low strength)

Map Unit	Soil type and setting	Soil Condition	Erosion Hazard	Trail Hazard	Off Road Travel Hazard Level	Road limitation
555	Typic Dystrochrepts (limestone escarpments)	Satisfactory	Severe	Severe (Too steep)	Severe (Erodes easily)	Severe (Slope)
578	Mollic Eutroboralfs (fine on basalt)	Satisfactory	Slight	Severe (Low strength)	Severe (Low strength)	Severe (Low strength)
579	Lithic Eutroboralfs (clayey/rocky on basalt)	Satisfactory	Slight	Severe (Too shallow)	Moderate (Low strength)	Severe (Too shallow)
582	Argiborolls (fine to rocky on basalt)	Satisfactory	Slight	Severe (Low strength)	Severe (Low strength)	Severe (Low strength)
584	Mollic Eutroboralfs (clayey/ rocky on basalt)	Satisfactory	Severe	Moderate (Too steep)	Severe (Erodes easily)	Severe (Shrink-swell)
585	Lithic Eutroboralfs (clayey/rocky on basalt)	Satisfactory	Slight	Severe (Too shallow)	Moderate (Low strength)	Severe (Too shallow)
586	Mollic Eutroboralfs (fine on basalt)	Satisfactory	Slight	Severe (Low strength)	Severe (Low strength)	Severe (Low strength)
Other soils within project area						
439	Typic haplustalfs (fine on basalt)	Satisfactory	Moderate	Severe (Low strength)	Severe (Low strength)	Severe (Low strength)
455	Lithic Calciustolls (loamy/ rocky on limestone)	Unsuited	Severe	Severe (Too steep)	Severe (Erodes easily)	Severe (Too shallow)
490	Typic haplustalfs (fine on sandstone)	Satisfactory	Slight	Severe (Low strength)	Severe (Low strength)	Severe (Low strength)
491	Typic Haplustalfs (loamy/ rocky on limestone)	Satisfactory	Slight	Slight	Moderate (Low strength)	Moderate (Low strength)
515	Vertic Argiborolls (fine on basalt fill)	Un-satisfactory	Moderate	Severe (Low	Severe (Low	Severe (Low

Map Unit	Soil type and setting	Soil Condition	Erosion Hazard	Trail Hazard	Off Road Travel Hazard Level	Road limitation
				strength)	strength)	strength)
523	Mollic Eutroboralfs (fine on basalt)	Satisfactory	Slight	Severe (Low strength)	Severe (Low strength)	Severe (Low strength)
524	Typic Argiborolls (fine to rocky on basalt)	Satisfactory	Severe	Severe (Low strength)	Severe (Erodes easily)	Severe (Low strength)
527	Lithic Haploborolls (limestone escarpments)	Satisfactory	Moderate	Severe (Too shallow)	Moderate (Erodes easily)	Severe (Too shallow)
565	Mollic Eutroboralfs (clayey/ rocky on basalt)	Satisfactory	Severe	Moderate (Too steep)	Severe (Erodes easily)	Moderate (Low strength)
567	Typic Eutroboralfs (fine on limestone)	Satisfactory	Slight	Severe (Low strength)	Severe (Low strength)	Severe (Low strength)
575	Lithic Eutroboralfs (clayey/rocky on basalt)	Satisfactory	Severe	Severe (Too steep)	Severe (Erodes easily)	Severe (Slope)
654	Eutric Glossoboralfs (loamy / rocky on andesite)	Satisfactory	Moderate	Moderate (Too steep)	Moderate (Erodes easily)	Moderate (Low strength)

Appendix C – List of Cumulative Effects

Cumulative effects include the impacts on the environment which result from the incremental impact of the alternative when added to other past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such other action (40 CFR § 1508.7). The following is a list of actions that resource specialist used to address Cumulative Effects for the Kelly Motorized Trail Project.

Grazing Allotments:

Lake Mary
Casner Park/Kelly Seep
Mud Springs
Windmill

Fuels/Forest Health Projects:

Mountainair Fuels Reduction/Forest Health: Decision 2006
Munds Park Fuels Reduction/Forest Health: Decision 2009
Howard/Priest Watershed Project: 2002

Wildfires:

Bolt (managed fire): 2010

Recreation Projects:

Munds Park Motorized Trails: Decision 2005
Mountaineer Community Trails: Decision 2005 (“Provide designated and maintained designated forest trail opportunities adjacent to the Mountaineer Community”)
Travel Management Rule: Decision 2012